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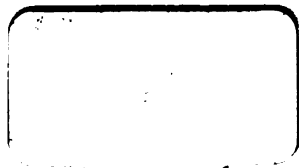
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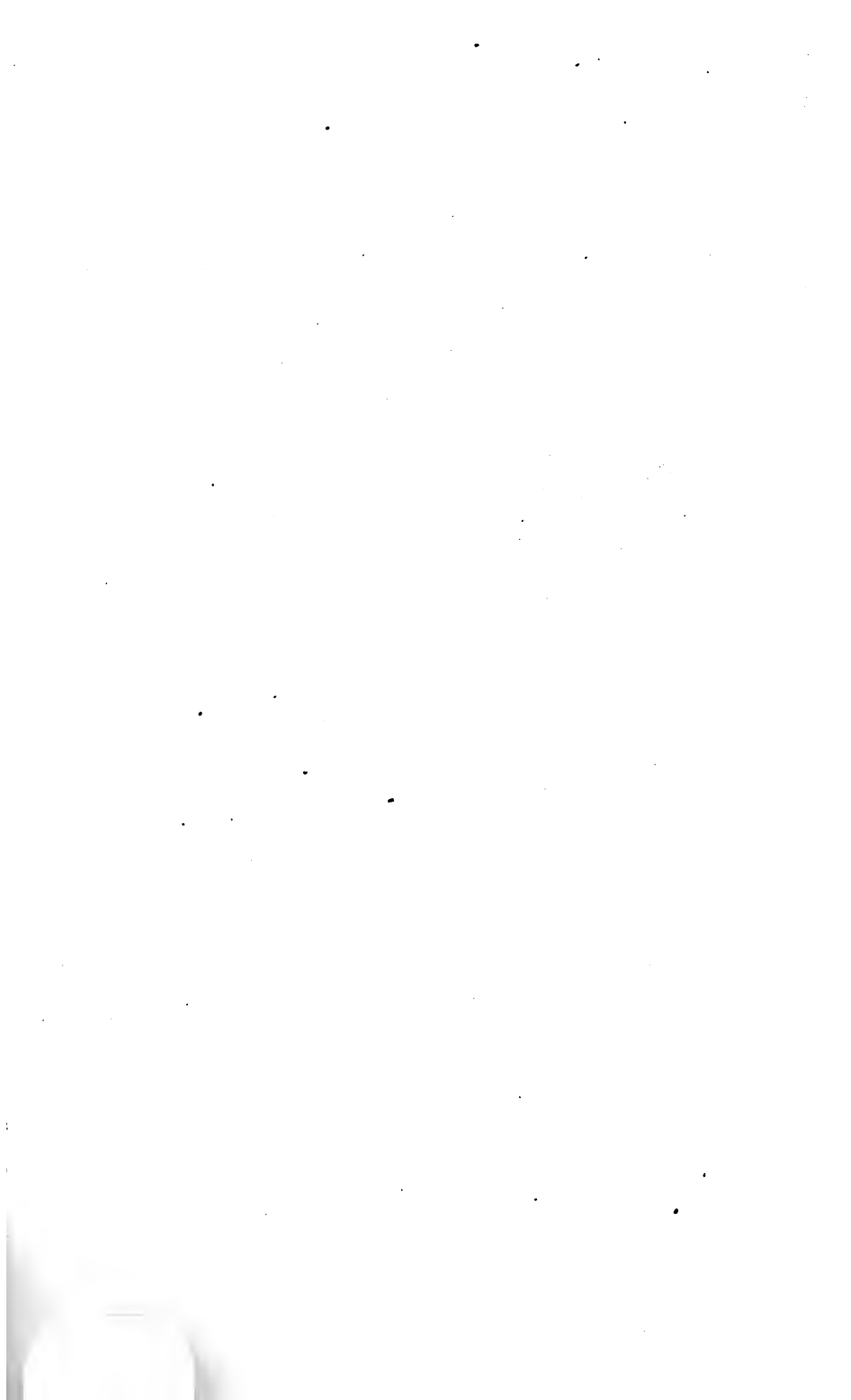
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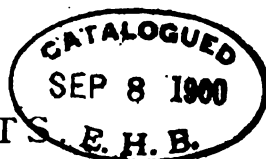
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DOUGLAS STANLEY, M.D. EDIN., M.R.C.P.,  
AND  
JAS. W. RUSSELL, M.D. CANTAB., M.R.C.P.

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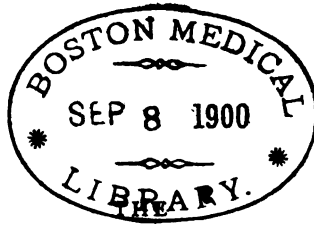
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## BIRMINGHAM MEDICAL REVIEW.

JULY, 1899.

## ORIGINAL COMMUNICATIONS.

NOTE ON THE TREATMENT OF SEVERE CHOREA  
BY SULPHOCARBOLATE OF SODA.\*BY T. STACEY WILSON, M.D.,  
PHYSICIAN, BIRMINGHAM GENERAL HOSPITAL.

IN this paper I wish briefly to put on record the success of a somewhat unusual mode of treatment in a case of severe chorea. Although it is never very safe to base an opinion upon the study of only one or two cases, there is, I feel, sufficient justification for the course I am adopting. Severe chorea is so fatal that any addition to our methods of coping with it is sure to prove of value; and moreover, severe chorea is not sufficiently common to insure the possibility of obtaining in a short time a long series of cases such as would prove beyond doubt the efficacy of any particular method of treatment. I therefore publish my observation without waiting till I can bring a number of cases to prove that sulphocarbolate of soda is as efficacious in certain cases of chorea as it is in cases of staphylococcus and other forms of "pyæmia" so-called.

The two cases I wish to report in this paper were precisely similar so far as their symptoms were concerned. The one was treated by the recognised means of dealing with chorea and died in eight days. The second case had precisely similar symptoms

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\* Read before the Midland Medical Society, March 15th, 1899.



and steadily retrogressed under similar treatment. When the fatal issue seemed imminent sulphocarbolate of soda was given, and in a most unmistakable manner checked the disease and saved the patient's life.

The result was so striking and so satisfactory that I have no hesitation in publishing my experience without delay, in the hope that patients may be saved by the adaption of the treatment here recommended who would die were I to wait till I had enough cases to prove the efficacy of the treatment.

The first case is that of a girl, aged 14 years. She had a perfectly good personal and family history so far as could be ascertained. A month prior to admission she fell into a canal, and within a week of the accident slight choreic movements commenced, together with a slight change in her manner and disposition.

The choreic movements continued to increase until her admission to hospital, one month after the accident and three weeks after the onset of the chorea.

On admission she was well developed, fairly nourished and not anæmic. She was evidently suffering from a very severe type of chorea. The movements were general, and incessant, involving face, head and tongue and trunk as well as the limbs. She could not feed herself, could only speak with difficulty owing to the choreic movements of the muscles of the mouth, and could not keep still enough to take nourishment unless her head was held by the nurse. The movements of the limbs were so violent that the knees, elbows, hips, etc., became excoriated in spite of the patient lying on a water bed, and had to be wrapped in cotton wool.

For the first three days chloralamide was tried in doses up to 20 grains every three hours, but without satisfactory results. Patient steadily got worse. Large and frequent doses of chloral hydrate were then tried, but only sufficed to give an hour or two of sleep without any amelioration of the choreic symptoms. Wet packing was also tried but without benefit. By the sixth day after admission her condition had become much worse. The

movements were still incessant but less powerful owing to increasing weakness. She was barely conscious and swallowed with difficulty. The heart was feeble and rapid, and would not respond to digitalis or alcoholic stimulants. She gradually sank and died of asthenia on the eighth day after admission.

There were certain striking symptoms presented by this case of which I wish to speak more in detail. The appearance of the patient was striking owing to an amount of capillary stasis which gave rise to flushing of the face and chest. The hands and feet were cold and bluish from the venous stasis, and there was great difficulty in keeping them properly warm. In addition to this flushing of the skin there was an absolute cessation of perspiration, and the skin felt very dry and rough. There were no special nervous symptoms beyond those usual in a severe case of chorea. The heart was not dilated, but there was a very variable systolic at the apex. There was no definite evidence of endocarditis. The temperature was uniformly subnormal, averaging about 97·5, and occasionally falling as low as 96. On *post mortem* examination there was some endocarditis, and the erythematous flush on cheeks and chest persisted.

My second case was in many respects the counterpart of my first. She was admitted into the very bed from which the patient of whom I have just spoken was removed on her becoming too noisy to be retained in the general ward. Her symptoms very closely resembled those of the former occupant of the bed.

The girl was fairly well developed and well nourished, aged 22. No anæmia. Her personal and family history was not so good as in the former case, as there was some rheumatic tendency in her family, and she herself had had scarlet fever followed by a slight attack of chorea when seven years of age. She had a recurrence of the chorea twelve months ago, and the attack seems to be a severe one as she was ill eight months or more. In October, 1898, she had another recurrence, and as she steadily got worse she came to hospital and was admitted November 29th, 1898.

On admission there was a considerable amount of choreic movement of the face, head and arms, but the case did not seem to be a very severe one. She was treated with increasing doses of liq. arsenicalis and occasional doses of chloral hydrate by rectum or by mouth. Her condition did not improve at all, and towards the end of the first week in hospital she began to get decidedly worse. Not only did the choreic movements decidedly increase but she also became strange in manner, and at times was quite delirious, and occasionally would scream loudly with no apparent cause. She became so noisy that she had to be removed to a private ward, at the same time her general condition got worse, and on the 10th day after admission her condition was very bad indeed, and her symptoms were exactly those of Case 1 a day or two before she died. The choreic movements were almost incessant, she had been for a day or two wholly unable to make herself understood in her lucid moments, and could only make meaningless noises in consequence of the choreic movements of muscles of articulation. She could not drink anything owing to the movements of her head unless someone held it still. She was now lying almost unconscious like our former case.

There was the same dryness and roughness of skin that I mentioned in the previous case. The same blueness and coldness of the hands. The same purplish red capillary flush in the cheeks and over and around the mammæ. The same feebleness of heart and variable systolic murmur. The same half-shut eyes with glazed conjunctivæ. The same subnormal temperature in spite of all the movements and the full feeding. The tongue was dry and covered with sordes as were also the teeth and lips. She also ground her teeth every few minutes. It was now quite evident that unless some decided amelioration in her condition could be brought about she had not more than two or three days to live.

In considering her condition in connection with the knowledge gained from the *post mortem* examination on the previous case there seemed to be some ground for hoping that some

antiseptic might prove efficacious. In the former case there was endocarditis with vegetations such as are so often associated with the presence of micro-organisms in the blood. Also the dry, harsh skin, and the peculiar venous stasis seemed most likely due to some toxin, as the condition of dilatation of vessels with absolute dryness of the skin and absence of perspiration cannot be considered a natural one. Again, since lungs, liver, spleen, and kidneys were all, so far as our powers of observation go, quite healthy, the most natural source for the toxin would be the growth of some micro organism in the system. Whether this line of argument be correct or not it was the line upon which my thoughts ran and which induced me to try an antiseptic mode of treatment.

The first antiseptic drugs I chose were sodium sulphocarbolate and quinine given in the manner recommended by Dr. William Carter, of Liverpool, viz., gr. xx. of the former and gr. i. or ii. of the latter, given every 2 hours, and which I have myself found to be of decided value in cases of *Staphylococcus pyæmia*.

On the 11th day after admission of our patient to the hospital this treatment was begun. I felt that in the face of an almost certainly fatal result I was justified in making the experiment, in spite of the risk that the depressing action of the sodium sulphocarbolate would only hasten the fatal termination. I therefore ordered 20 grains of sodium sulphocarbolate every two hours and 1 grain of quinine every two hours, to be taken alternately. I stopped the arsenic and digitalis she had been having, but continued the occasional use of the chloral in 30-grain doses, and also the hot packs which we had been giving her to try and induce perspiration. I also continued to give her the strong extract of raw meat partially peptonised, which she had been having for some days, for I am convinced of the value of supplementing the treatment by sulphocarbolates with some such highly nutritious diet.

Thus the only change made in the treatment of the case was the substitution of the sulphocarbolates and quinine for the arsenic, digitalis, and small dose of salicin which she had previously been taking. The result was however most satisfactory.

There was only very slight improvement for thirty-six hours after the commencement of the antiseptics, but then most marked improvement set in. Chloral, which had previously failed to give sleep, now began to take effect, and the hot packs, which previously seemed to do very little if any good, now had a decidedly soothing result.

The sulphocarbolate was begun on the 10th Dec. at 11 a.m. On the 12th she showed marked improvement and was much quieter. She seemed more inclined to sleep when in the wet packs and the choreic movements were decidedly less. She was still noisy and shouted incoherently at times and was still unable to speak coherently.

Next day (the 13th) 48 hours after commencing the antiseptic, the improvement was striking. The chorea had so much diminished that she was able to make herself understood in her lucid intervals, but during the greater part of the day she was quite delirious, though not noisily so. She slept very well after chloral, 2 doses of 30 grains giving her seven or eight hours sleep. A well-marked copious crop of herpes labialis appeared on this day around the mouth and nose, but especially on the lower lip and chin.

By the end of the fourth 24 hours she had become quite sensible and very much quieter and was sleeping the greater part of the day and night. The patient made a speedy and satisfactory recovery.

I know that it is not right to lay much stress upon a successful result in a single case, but this case seemed to show, as clearly as a single case could, the efficacy of the sulphocarbolate (coupled with quinine and stimulating food) in arresting a case that had every appearance of rapidly running to a fatal issue.

One of my colleagues at the hospital used the sulphocarbolates for a somewhat severe case of chorea in a child with very satisfactory result. They were tried in another—a very severe and advanced case in an adult—but they did not avert the fatal issue. They are well worth a trial, but owing to their somewhat depressing action it is very important to keep up

nutrition by full and stimulating feeding. For this nothing is equal to uncooked or partially pancreatized raw meat juice in addition to milk. I also give quinine, gr. ii., every two hours, alternating with the sulphocarbolate of soda.

It is more than probable that many cases of chorea have a micro-organismal origin and would be cured by the treatment here suggested.

I bring this suggestion before you because this severe type of chorea is so fatal that it is well to make more generally known a means of treatment which in some cases, at all events, is eminently successful.

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## REMARKS ON THE TREATMENT OF OCCUPATION NEUROSES.\*

ILLUSTRATED BY TEN CASES.

BY T. SYDNEY SHORT, M.D., M.R.C.P.,  
PHYSICIAN TO THE INFIRMARY AND ASSISTANT PHYSICIAN  
TO THE GENERAL HOSPITAL, BIRMINGHAM.

WHILE sketching the outline of this paper I found that it would be quite impossible to deal with the condition known as Occupation Neurosis in so short a time as that at my disposal, even if a short *résumé* only of the subject were given. I therefore decided to deal especially with the *treatment* of this condition, introducing the subject with a few remarks on ten cases of which I have notes.

Of these ten cases, all of which have been under my care, four were examples of writer's cramp, one of writer's tremor, and and one of combined cramp and tremor. Three cases were examples of what is commonly known as hammer palsy, and the tenth was a case of wasting of the muscles of the hand in a compositor, such wasting following cramp in the muscles arising during his work.

It will be noted that none of these cases was of the true neuralgic type, *i.e.*, exhibiting pain as the main symptom with

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\* A paper read to the Midland Medical Society on March 1st, 1899.

very little or no spasm, a condition which is not common. Indeed, I should seriously doubt the diagnosis in a case where absolutely no other symptom beyond pain was present. The only case I have ever seen which was said to be of this nature strongly suggested malingering. It was in a female patient who was anxious to get away from work, and the circumstances were suspicious. Directly her object was attained it was wonderful how soon she got well.

In all my ten cases the patients were of a neurotic type—to use that much abused term in its best sense. They were not hysterical or emotional, but were of that particular temperament which is sensitive, conscientious, and desirous to do the best work possible. A neurotic inheritance was only present in one case, and I had the opportunity of seeing both the father and the son. In each of the six forms of writer's neurosis either worry or overwork was present as a cause; several of the cases gave a history of both. What is perhaps more important, however, is this—*all the cases wrote a hand that entailed a considerable amount of work on the part of the intrinsic muscles of the hand.* Not a bad hand, by any means, from a schoolmaster's point of view, a good one rather; but if ease in writing be taken as a criterion, certainly a bad one.

#### BRIEF CITATION OF TEN CASES.

I propose to say a few words on the cases and then to deal with the treatment more fully. Each of the four cases of writer's cramp was severe in nature. The first was a clerk who never had any difficulty with his writing until one day he read an account of writer's cramp in one of the papers dealing with gossip and condensed information which seem to be so popular just now. Soon after this he felt a twitching in the arm after he had been writing for about ten minutes as if somebody pulled his sleeve at the elbow. Then the ulnar border of the hand doubled under and he was forced to rest. Unfortunately he got into the clutches of one of the electric belt quacks, and for eighteen months got steadily worse. When I saw him he

was unable to write with his right hand but could manage a little with his left. Massage and electricity with complete rest from writing improved him greatly, and when I last saw him he could write well enough to resume his employment. He had no symptoms of cramp in the left hand.

The second and third cases were father and son, and form a good example of the hereditary tendency to neuroses which such cases often exhibit. The father was a thin worry-looking man aged 51, a warehouse clerk whose occupation demanded much writing. He said that he was quite well until seven months before I saw him, when he had an unusual amount of writing to do and had to sit up late to get it finished. When writing his hand often became so tired that he was obliged to stop and rest it. If he did not stop, it became stiff and cramped. This was followed by pain in the shoulder and arm, never felt unless he was writing, and leaving him quite free to perform any other movement. When seen his condition was quite typical. He could perform all ordinary movements with the hand and fingers, but directly he took up a pen his hand seemed weak, and he was unable to move it freely, especially in making upstrokes. He got over the difficulty caused by the internal rotation of the little finger by pressing very hard upon the paper, so that as he usually broke the nibs of a pen he was obliged to use a pencil and to keep the point blunt and strong. It is interesting to note that in this case when first seen the *infraspinatus* of the right side was smaller and flabbier than that of the left. This is the muscle which serves to keep the alignment in writing, by means of the gradual outward rotation of the humerus, and at first sight its defect suggested an explanation of his trouble. After he had been under treatment, however, for two months by massage, no difference could be detected between the two sides, yet his writing was very little better.

His son, an unhealthy-looking man of 26, presented exactly similar symptoms and was taken ill five months after the father. He had been a civil service clerk till twelve months before I saw him, when he gave up his situation on account of the commencing



difficulty in writing, and became a teacher in a Board school. He too was obliged to use a pencil, and frequently drove it through the paper on account of the force he used. He was in a deplorable condition of nervous irritability and took the gloomiest view of his condition; and as he said it was quite impossible for him to give up writing altogether, I think he was somewhat justified. I only saw this case twice, as he lived at some distance from Birmingham and would not follow out the treatment advised.

The next case is of special interest because the spasm developed in the left hand ten years after the original trouble in the right. This man is a clerk in a parcels office and fortunately for him he is able to do a fair proportion of his writing with a blue pencil. When he was first attacked with the cramp he taught himself to write with the left hand, and for ten years had done his work in this way. A heavy season during the summer of 1897, caused the left hand and arm to feel tired, and his writing became irregular and jerky from spasm causing the ulnar side to turn inwards. He became terribly depressed and melancholic to the verge of suicide, fearing starvation for himself and family. There was no wasting of the left arm and hand when I saw him, but the thenar muscles and interosseous groups showed decidedly diminished excitability to the Faradic current. He said that when his right hand was affected the muscles between the bones had wasted, and they certainly were not so well developed even when I saw him as those on the left side, but I could find no evidence of paralysis. I succeeded in getting this man a holiday with entire rest from writing, and then put him on massage and the Faradic current. I also encouraged him to write from the shoulder, and in all cases where it was absolutely necessary to use a pen I advised a ball-pointed nib. These cases usually require a hard pen, and I found that what is called a "camel pen" especially suited him. For general purposes I should call it too unyielding. Taking into consideration the severity of this case he has done very well. He can write fairly well now with either hand and does all that is required of him at his work. I have especially

advised him to rest his hands by using them turn by turn about, and I am glad to say that his melancholia has quite disappeared and he is cheerful and happy again, a most important factor in the case.

The two cases of hand tremor were in an earlier stage of the affection than those I have already described. One of them was a middle-aged man, a busy accountant in this city. His trouble only came on when he had an extra amount of writing to do, and this especially occurred when he had to attend large business meetings. The tremor was particularly annoying to him on signing his name, an action which is almost automatic with most people. He was terribly afraid lest a suspicion of alcoholic indulgence should rest on him, and this worried him and made him worse. He was just beginning to have spasm of the hand, but fortunately this had not reached an acute stage.

The other case was in a younger man, who had less writing to do, but suffered in a similar manner, especially on occasions when it was particularly important he should write well. He had more spasm, with rotation inwards of the ulnar border of the hand.

In each of these cases it was necessary for the patient to relinquish his usual mode of writing, which was cramped and made too great a strain upon the small muscles of the hand. By adopting a freer method of writing from the shoulder, the first case was cured, and the second, still under treatment, has been greatly improved, and will, I believe, get quite well.

#### THREE CASES OF HAMMER PALSY.

The particular neurosis of which writer's cramp, on account of its frequency, is usually taken as an example may occur from any muscular action often repeated, *e.g.*, working the Morse system of telegraphy, the constant practice on a musical instrument, or the continual use of a particular implement, such as the needle in sewing, or the hammer in more manual labour. In the neighbourhood of Birmingham the hammer is employed in many industries so that forms of neurosis due to its constant use are not uncommon.

Three such cases have lately come under my notice at the Hospital, and as they present similar symptoms it will not be necessary to cite them in detail. These three cases were curiously enough of the same age, viz., 32 years. Each complained of a numbness of the thumb, first, second, and part of the third fingers, with weakness of the hand and wrist. One man who was sent to me by Mr. Heaton had previously suffered from some similar attack six years before. He was a file cutter, and gave up his work for that of a bricklayer's labourer for about three years. At the end of this time he took to file cutting again and continued for three years without any trouble. The numbness that he complained of did not cease when he left off work, but became constant and kept him awake at night. He could handle the hammer with effect for about ten minutes. Then his hand would grip it with a firm spasm and would go on hammering at the chisel with a series of quite feeble taps till the hammer fell from his grasp. This case showed a faint blue line on the gums, and it is very probable that his condition was predisposed to it by lead in the system. He had however no muscular wasting, colic, or drop-wrist, and had never suffered from any of the usual symptoms of lead poisoning. Three months' treatment sufficed to cure this case. The two other cases were very similar to the one I have just narrated, but there was no history nor sign of lead about either of them. One of these men also was a file cutter, and although he showed no sign whatever of lead poisoning it is possible that lead was a predisposing cause. The other man worked in metal, but not lead. When at work he used a hammer weighing  $4\frac{1}{2}$  lbs., and had to make as many as sixty or seventy strokes a minute. None of these men had any wasting or sign of neuritis.

#### A CASE WITH MARKED WASTING.

The case of the compositor whom you have seen to-night is of more than ordinary interest. The wasting of the thenar muscles and of the interossei and lumbricales places the case in a different category. Some authorities would reject all cases

which show actual muscular wasting from inclusion in the term, "occupation neurosis." It seems to me, however, that it is difficult, even if advisable, to draw so distinct a line. In the case of the clerk in the parcels office there had certainly been wasting, and his was a very typical case of writer's cramp. This shows that wasting may be present in such cases. In the case of the compositor there had been no numbness nor tingling in the hand at first, but slight spasm of the fingers which prevented his holding the compositor's stick. Weakness and wasting, presumably due to a neuritis, then followed. He has been under treatment now for about ten weeks and has improved considerably. When first seen it was with difficulty that the wasted muscles could be made to react even to a strong constant current, and now they react about equally to the two currents, and also equally to the two poles of the voltaic battery, that is to say, the reaction of degeneration which was present has nearly disappeared. The movement, too, has greatly improved and the thumb can be opposed to the fingers, an action he could not perform when I first saw him. In spite of this decided amelioration I think the ultimate result in this case is still doubtful, and am inclined to give a guarded prognosis. The wasting has been so extreme that a severe lesion must have been present, and I have on more than one occasion seen decided temporary improvement in cases which eventually developed progressive muscular atrophy.

#### TREATMENT.

The first thing to be done in the way of treatment is to abstain altogether if possible from the particular action which causes the trouble. This is often a difficult matter to manage. A clerk can generally get some relief from writing if he can still do a little and keep at his work, but he cannot hope to give it up altogether. Cessation from work means loss of money, and consequent unhappiness at home. The mental condition is so important a factor in these cases that it is worth while relaxing rules a little to prevent a man falling into despondency. It is

most important that the patient should be thoroughly imbued with the idea that he will get well. If he is at all half-hearted his recovery will be retarded.

After rest, or partial rest, from the particular occupation, the next important part of the treatment is the keeping up of the nutrition of the muscles concerned by active or passive movements and electrification. This should not be commenced, however, if there is much pain. Pain of the neuralgic type is best relieved by keeping the hand and arm at rest altogether with the external application of belladonna. In some cases pain is relieved by the application of the constant current. If there is no pain, massage may be commenced at once with daily application of electricity.

#### TREATMENT OF WRITER'S CRAMP ESPECIALLY.

So far my remarks on treatment apply to all cases, but special cases require special treatment, and as writer's cramp is probably the commonest form of this neurosis we will take this as a type.

I consider that active muscular exercises for the hands are of the greatest value, and as a relief from writing I order some special muscular movement to be practised for a certain time every day. The playing of a musical instrument is useful, or the movements entailed in carpentering or gardening, or even knitting, netting, or similar occupation may be indulged in, if the patient has not the facilities for practising some more masculine form of work. The fact that an occupation such as knitting is considered feminine should never stand in the way of a man's recovery.

With regard to the actual writing itself much can be done. First of all, the patient should practise writing with the left hand in order to rest the right. Very fair upright writing can soon be learnt with the left hand. Next, the style of the writing must be changed. Sufferers from this complaint usually write in a cramped manner, throwing nearly the whole of the work on the small muscles of the hand. By this I do not mean that the writing looks small or cramped, but that the hand is held in

such a position that the muscles soon become cramped. All this should be changed. The writing should be done from the shoulder, and the patient should not only be told to do this, *but he should be personally taught how to do it.* To this end I have found that making the patient write large letters, pot-hooks or "n's" on a blackboard is capital practice. When a blackboard is used the shoulder muscles are of necessity brought into play, on account of the position assumed. For home practice a sham pencil can be used on a wall, or chalk letters may be made upon a piece of brown paper pinned to a door, wall, or side of a wardrobe. Twenty minutes twice a day is sufficient to begin with.

There are many details in the act of writing which require attention in addition to the actual style. If the desk or table is a little too high for the chair, the ulnar border of the forearm is apt to get too much pressure, and the ulnar nerve may be slightly irritated because there is a tendency to rest the forearm against the edge of the desk continually. A thickish penholder is better than a thin one, and it should not be smooth. A cork penholder is usually recommended on account of its lightness. This I consider is quite a mistake. It is much easier to write with a penholder of the average weight. The very lightness of the cork seems to cause a failure from loss of momentum. As a parallel I would cite the example that must be well known to all, of the fatigue that is caused by using forceps with a very weak spring, compared with that entailed in grasping a pair that require actually more power to close. I am instancing this simply as a parallel, not as a proof. A quill is too thin to hold in the hand comfortably, but a quill nib may with advantage be put into a thicker penholder. Ball-pointed pens are useful. The writer should be encouraged to make all his strokes of about the same thickness. A great deal of power is lost in making the down strokes much thicker than the up. A lead pencil is of course much easier to write with than a pen, and soft blue crayon pencils cause less fatigue than black lead.

In order to train the hand, I generally make my patients

commence the study of shorthand. It does not matter if they give it up when they are cured. The signs used in stenography are so difficult to draw correctly, that the training of the hand muscles involved in the study is splendid exercise for fine and delicate movements. It is a fairly well known fact that shorthand writers, *e.g.*, reporters are singularly exempt from writer's cramp. Any exercise which the patient likes to choose for the development of the muscles of the hand may be considered. All fine and delicate movements of the hands and fingers are better performed by strong muscular and well-trained hands than by weak ones, however delicate the latter may look. Thus violinists tell us that the finest movements required for that most exacting instrument are best performed by powerful and even massive hands.

Ordinary drawing lessons are of great value. Pencil drawing develops especially the first interosseous (dorsal) muscle. I had occasion to observe, a short time ago, the hand of a teacher of drawing, whose work entails much bold freehand drawing and the accuracy of line required in designing, and I was struck with the manner in which this muscle stuck out like a marble when a pencil was grasped.

#### USE OF A TYPEWRITER.

Amongst a considerable section of the public the idea that a typewriter is a cure for writer's cramp has a firm hold. It is also mentioned in text-books as an important means of treatment. It is only in special cases however that it is of any use. By far the greater portion of writing performed cannot be executed on a typewriter. It is out of the question for any writing done in a book, and the main portion of office work comes under this head. Besides, it is not by any means the men who do the most writing who are subject to writer's cramp. It is often those who have the most headwork to do, and they are not the men who perform the bulk of the writing in any office or similar place. This is done by the juniors, who would also work the typewriter, so that the actual sufferer would probably not be benefited at

all. A typewriter is especially useful for copying what has been already written, and for anyone who has this kind of work to do it would afford the ease that comes from distributing the work over both arms instead of confining it to one. For letter writing the typewriter is of some use, especially for such letters as are of a stereotyped nature like many of the communications sent from offices or warehouses. For really important letters however its use is much more limited. It is sufficiently difficult to dictate an important letter to an amanuensis, but it is much more difficult to compose one on the typewriter. At the same time, if a patient can make use of a typewriter it is doubly useful to him, because it not only rests the hand from writing but it provides a new course of exercise for the fingers.

To sum up then I should say that for those in whose business a typewriter can be substituted for ordinary writing it is of particular use, but that such patients are rather the exception than the rule.

With regard to general treatment there is really little to be said. Strychnine may be given internally, and tonic treatment generally is indicated. A complete change, such as a holiday affords, is of the greatest service, but unfortunately this condition usually arises in the very class who have the greatest difficulty in getting away from their business. Without discussing the question whether the complaint is of central origin, peripheral, or both, there can be no doubt that the mental condition is an important factor in the case. The depression must be got rid of somehow, and when this has been accomplished the best results seem to be attained by rest at first, and then systematic exercises for the hand.

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**THE PREVENTION AND CURE OF TUBERCULOSIS.\***

BY C. BRAINE-HARTNELL, M.R.C.S., L.R.C.P.  
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THE English nation is very conservative in its principles and deliberate in its action. The individual Englishman is sceptical about new theories, and is slow in accepting them until they have been proved to be correct by men of other nations. To-day, as regards the treatment of tuberculosis, our prudence and conservatism are well marked. For forty years the open-air method of treatment has been carried out on the Continent with undeniable success. In England we are only just waking up to the fact that such a method is at all feasible, and we are still doubtful as to whether or no it is scientific. We are groping in the dark, uncertain as to the next step, and all the time our foreign colleagues are basking in the sunlight of certainty and assured success. That there is a future in England for the open-air treatment of tuberculosis there can be no doubt. Why we have for so long a time sent our patients to foreign health resorts and foreign sanatoria must remain a puzzle. We have in England many places where sanatoria might be built, and there is no reason why our results should be in any way inferior to those obtained in Germany. Our patients would, in addition, gain these great advantages :—

1. They would avoid a long and tedious journey.
2. They would be surrounded by people of their own nationality.
3. They would not have to put up with foreign food and foreign ways of cooking it.

For centuries the value of pure air has been recognised, but, curiously enough, not utilised. It is to Brehmner, the founder of the first sanatorium at Goerbersdorf, in Silesia, that the world at large owes a debt of gratitude ; for it was he who first placed the

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\* An abstract of a paper read before the Worcestershire and Herefordshire Branch of the British Medical Association.

open-air method upon a scientific base, and changed the pessimistic view of tuberculosis into one of at least hope, where formerly there was no hope. One of the most striking features in the study of tuberculosis is the enormous decrease in the death-rate that has taken place from this disease in the last sixty years. According to Ransome, in 1838, the mortality for each 100,000 living was over 38, while in 1895 it had fallen to under 14, a diminution of nearly two-thirds. Thorne-Thorne reckons the decrease in the mortality, between the years 1851 and 1895, and between the ages of 20 and 45, when tuberculosis is most rife, at 50 per cent. In London there has been a diminution in the death-rate from tuberculosis alone of more than 300 per million in ten years. This decrease is almost entirely due to improved hygiene. There is always a great decrease in the mortality from tuberculosis after draining the subsoil of a town. Salisbury and Ely are standing witnesses of this fact.

To-day the average death-rate in the world, from all causes, is 22 per 1,000. The average death-rate from pulmonary tuberculosis is 3 per 1,000, or one-seventh of the whole. In England and Wales the annual death-rate from tuberculosis is at least 40,000 to 50,000. Murrell, from the statistics of the year 1892, shows that the mortality from tuberculosis was over 50,000; from cancer, a rapidly increasing disease, 20,253; and from zymotic disease, including influenza, 82,099. In the face of such figures it is absolutely necessary that we should take some definite steps to stamp out this scourge of tuberculosis.

To deal first with the question of the Open-air Treatment, Sanatoria are to-day to be found in Germany, France, Switzerland, Norway, Sweden, Russia, Belgium, North and South America, Mexico, and many other places. The chief ones that I visited in Germany are at Falkenstein, Rupperstein, Hohenhonnef and Nordrach. Besides these, many others are shortly to be built in connection with every large town in Germany.

The results obtained at these Sanatoria have to be seen before they are believed. At Falkenstein and Hohenhonnef about 15

per cent. of the cases are cured, and another 15 per cent. relatively cured. At Nordrach the results are still better. An enthusiastic patient, himself a doctor, told my partner that the cures could not be less than ninety per cent., and another patient told him that they were at least sixty per cent. The excellent results obtained at Nordrach are probably due to three causes :—

1. Increased supervision and consequently more rigid discipline.
2. The greater amount of nourishment taken at longer intervals.
3. The increased exercise.

The rainfall at Nordrach is copious, but it does not seem to have a deleterious effect upon the patients. In England we are at last beginning to treat our patients by the Open-air Method. Dr. Burton Fanning has been doing so at Cromer for some time past, and has had good results. Dr. Jane Walker, Dr. Johns, and Dr. Potts are also carrying out the same line of treatment. There is already a Sanatorium near Edinburgh, and one is to be built shortly in Yorkshire. Dr. Smyth, who has been at Nordrach both as a patient and a physician, is shortly starting one in the New Forest. Dr. Pruen and I have built one on the Cotswold Hills.

What are the essentials for a Sanatorium?

1. The air must be pure and as free from contamination as possible, and therefore no sanatorium should be built near any town or factory. An elevation of some hundreds of feet is desirable though not absolutely necessary. Pure air means freedom from re-infection, and that is why it is so important. It has been calculated that in the open-air each person receives 324,000 cubic feet of air every hour.
2. The site is most important. The chief rooms must face south, and there must be protection from the north and east winds. The soil should be gravel and must be well drained. It is essential that the foundations should be dry.
3. There must be free access of sunlight, for the sunlight is

directly antagonistic to the bacillus. Ransome and Delephine found that exposure of tuberculous sputum to the sunlight for one hour destroyed the bacilli, so that guinea pigs when inoculated gave no result.

4. There should be facilities for walking preferably through woods, and each walk must be carefully planned. It is advisable that the walks from the sanatorium should be up a slight incline, so that the homeward journey be always down hill and thus fatigue is saved. Seats should be placed at easy distances, so that patients may have every opportunity of resting.

5. The diet should be carefully regulated and the food plentiful. The very best food should be procured, and the cooking must be good and appetising. Too much stress cannot be laid upon this point. The tissues have to be built up, the wasted system fortified, in order to withstand and conquer the ravages of the tubercle bacillus. Three meals only a day should be given, and feeding between meals must be prohibited.

6. Within the house there must be free ventilation and the free admission of sunlight. The bedroom window must never be closed day or night, whatever the weather, except while the patient is dressing or undressing. The walls should be varnished or covered with a washable paper or linoleum; the floors with linoleum, so that they may be easily cleaned. Carpets and curtains should be dispensed with. A uniform temperature may be maintained by means of hot water pipes. The lighting should be by electricity. Cleansing the furniture with a damp cloth should be substituted for dusting.

7. Every patient must be provided with a Deitweiller's flask containing a weak solution of carbolic, and forbidden on pain of dismissal to spit anywhere else.

8. In small sanatoria earth closets may be used. Vivian Poore, in his book on "Rural Hygiene," has shown how infinitely superior they are to waterclosets.

9. All cattle used in connection with the sanatorium should be tested with tuberculin, and only those who do not give the reaction employed. All the milk should be sterilized. The

cow sheds must be kept scrupulously clean, well drained, and well ventilated, at least 800 cubic feet being allowed for each animal. The cows themselves should be re-tested every six months.

Now as regards the prevention of tuberculosis.

The question as to whether or no tuberculosis is hereditary is a deeply interesting one. For many years the direct hereditary transmission of pulmonary tuberculosis was not even questioned; it was looked upon as an assured fact; to-day we cast great doubt upon it. True, a child of tuberculous parents may inherit a constitution which may be characterized by a weakened power of resistance to the tubercle bacillus, but this by no means proves that tuberculosis is directly hereditary. Cattle, as we shall presently see, are very prone to contract tuberculosis, but it is an exceedingly rare thing to find a calf born with definite signs of the disease. In the great majority of cases the disease develops during the first or second year of life, that is after having been nourished on its mother's milk, which is, perhaps, teeming with bacilli. Take a calf away from its tuberculous mother, feed it upon sterilized milk, give it fresh air and clean stables, and this very calf will, in almost every case, escape tuberculosis. We grant that in very rare cases a calf is found tuberculous at birth, or the placenta may even contain bacilli, but the percentage is only 0.18. This matter was enquired into very thoroughly on the Continent a short time ago, and out of 610,000 calves only twelve were found tuberculous. It is difficult to understand why human beings should show a strong hereditary tendency if cattle do not. We must take into consideration the fact that people living in the same family, or residing in the same house, become tuberculous because they infect one another. In the vast majority of cases patients spit anywhere and everywhere, the sputum dries, and is a constant source of infection; in other words, the unventilated, sunless rooms, become hot-beds of infection. I know that experiments made by observers with dust from tuberculous surroundings, have, in some cases, failed to produce tuberculosis in susceptible

guinea pigs, though Cornet has done so over and over again ; but it cannot be gainsaid that apparently healthy people, on occupying houses in which tuberculous patients have lived and died, have themselves become tuberculous. It is, therefore, an undeniable fact that a large number of persons become tuberculous through the respiratory system by inhaling the bacilli from dried sputum. From this we learn—

1. That the sputum should never be allowed to get dry.
2. That cases of tuberculosis should be notified.
3. That houses in which tuberculous persons have lived or died should be thoroughly disinfected.
4. That all persons should be taught the value of sunlight and ventilation, and the importance of perfect drainage.

A large number of persons, especially children, become infected through the alimentary system, and therefore the question of bovine tuberculosis becomes one of great importance. The prevalence of tuberculosis amongst our dairy stock is startling, and it is essential that measures should be taken to eradicate this disease. We have Professor Delephine's authority for stating that after the age of three years one-half of the cows under present conditions are doomed to become tuberculous. Cows are much more liable to the disease than oxen. The returns from Leipzig, for 1897, show that among the slaughtered animals the following percentages were tuberculous :—

|                       |                        |
|-----------------------|------------------------|
| Oxen, 35·10 per cent. | Calves, 0·18 per cent. |
| Cows, 48·09.          | Sheep, 0·02.           |
| Heifers, 20·35.       | Pigs, 2·73.            |
| Bulls, 23·83.         |                        |

In Glasgow, from October, 1895, to October, 1897, 1,279 cattle were condemned as tuberculous ; of this number 1,260 were cows. In applying the tuberculin test to 90 cows, belonging to one dairy in Cheshire, 70 gave the reaction, or 77 per cent. During a rigid inspection of 29 towns in Saxony, in 1895, tuberculosis was found in 27·48 per cent. of the number killed ; 92·5 per cent. of these were passed as fit for human

food; 5.5 per cent. were sold in the Friebank as inferior food at a cheap rate to the poor, and 2 per cent. were destroyed as unfit for food. Among the animals slaughtered in the Manchester abattoir, King found 41 per cent. of the cows tuberculous. In spite of the prevalence of tuberculosis among cattle, calf lymph does not convey the disease chiefly because the virulence of the bacillus is destroyed by being mixed with an aqueous solution of glycerine. This has been proved experimentally. In any case it would be wise to take the precaution of testing the calves beforehand.

In tuberculin we have a sure and certain diagnostic test for tuberculosis in the cattle. The test is easily carried out. The temperature of the cow is taken beforehand, and should be about 100° F. Each cow then has a subcutaneous injection of from 2.3 cc. (50 minims) of a one per cent. solution of Koch's tuberculin. After eight hours the temperature should be taken in the rectum, and then every three hours. No rise occurs in healthy cows, but in an affected one it may rise to 106° or 108°. No water should be given during the time of testing, as it has been found that water in the stomach may reduce the temperature to normal. The cattle should be tied up for a day or two before the experiment. The test does not affect the milk or pregnancy. It is interesting to note that cattle in the last stage of tuberculosis do not give the reaction.

In Belgium, out of 22,000 cattle, 14,000 or 63.7 per cent. reacted. In France no animals are allowed to be imported for breeding purposes unless they have stood the tuberculin test. From these results it follows that—

1. All cattle should be tested, and those that give the reaction must be separated from those that do not.

2. Infected animals should be slaughtered and sold to the butcher if fit for human food, or they may for a time be kept for breeding purposes, provided that the calves are fed upon sterilised milk. It has been shown that there is little or no danger in eating meat from tuberculous animals provided that the lesion is localised. If guinea pigs be fed upon tuberculous

meat very few of them become tuberculous, but when fed upon milk from tuberculous udders they all become affected. In the last twenty years there has been a great increase in meat eating but a decrease in tuberculosis.

With reference to Bovine tuberculosis it has been recommended that :—

1. It should be compulsory to use public slaughter houses only.

2. All carcases should be examined by qualified and competent Inspectors ; by preference, Veterinary Surgeons. At the present time any person can become a Meat Inspector in England, whether he be an omnibus conductor, a plumber, or a carpenter. This is obviously wrong, and so long as it exists, facts and figures must remain in a chaotic state. In Germany, all Meat Inspectors are Veterinary Surgeons, and have had in addition special training in public slaughter houses. As before mentioned, the majority of meat from tuberculous cattle is fit for human food, but it should be cut up and exposed for at least half-an-hour to a temperature of 212° F. in a steam steriliser.

Carcases should be wholly condemned if :—

1. The animal is emaciated.
2. It presents a bad appearance.
3. Lesions are present in the muscular system.
4. Important lesions are present in other organs.

*(Report Royal Committee.)*

It is a curious fact that Jews who reject any carcase in which tuberculosis is found are almost free from tuberculosis. In Denmark the prevention of tuberculosis is being most ably carried out by Professor Bang, the necessary money being provided by the State. Professor Bang considers that last century Denmark was free from bovine tuberculosis, and that the disease was introduced by cattle from Switzerland in 1840. The affected animals are rigidly separated from those free from the disease, and in the past few years a great diminution in the number of diseased animals has been noticed.



In England, 55,000 animals could be tested for £5,625 or 2s 3d. a head, and yet it is not done. As a nation we still persist in drinking raw milk from tuberculous cows, and allowing the germs of disease to be disseminated amongst our cattle. When we consider how great the mortality from tuberculosis is in England, and how simple the remedies are, it is nothing short of a national disgrace to think they are not carried out.

For tuberculous milk, which is the cause of so many cases of tuberculosis in infancy, we have a sure and certain remedy. Boil or sterilise the milk. It is a well ascertained fact that milk from tuberculous udders, and milk purposely contaminated with tuberculous matter may be rendered harmless by being boiled for the space of one minute. The boiling of milk is doubly important when we remember that raw milk is befouled by many micro-organisms besides the tubercle bacillus. It has been found that if raw milk be examined by a skilled bacteriologist before and after it has been passed through a "Separator," the cultures made from the milk before it has been separated contain one hundred times as many bacilli as it does after it has gone through the process. By sterilising the milk we render these micro-organisms harmless. Much of the diarrhoea of infancy which is classed as Gastro Enteritis, is undoubtedly tubercular in origin, and although no definite physical signs can be found during life, yet the retro-peritoneal glands in many cases contain tubercle bacilli. At Fécaux, in Normandy, a Society has been started for feeding infants upon sterilised humanised milk. During the past three years the infant mortality has been reduced 50 per cent., and the deaths from enteritis have diminished from 30 to 16 per cent. At the Crèche, at Rethel, before using sterilised milk the mortality in the year 1893 was 13 per cent.; in 1894, after adopting sterilised milk it had fallen to 5 per cent.; in 1895, 3 per cent.; and in 1896, 2·80 per cent. At Grénoble, the average mortality of the infants from diarrhoea during the years 1894-5-6, and for the months of July, August, and September, when fed upon *non*-sterilised milk was 69·3 per cent., but the mortality amongst those fed upon sterilised milk was 27·9 per cent.

Hope, the Medical Officer of Health for Liverpool, collected 24 samples of milk from country districts arriving at the railway stations; no less than 29·1 per cent. of these specimens produced tuberculosis in guinea pigs.

In Copenhagen great cleanliness is enforced while milking, and all the milk is filtered through three layers of fine gravel. In Stockholm the milk is strained through muslin and very fine copper wire gauze. By these means the milk is greatly purified. Milk from tuberculous cows is not infective, according to Thorne-Thorne, when the udders are diseased, but often it is impossible to find this out until a *post mortem* examination is made.

Pigs are sometimes affected with tuberculosis, and also poultry. The temperature of swine is so variable that the tuberculin test is of very little value. Cats and dogs may become infected. That fishes may become tuberculous is shown by the following fact: The sputa and dejecta of a woman, suffering from advanced tuberculosis, were thrown into a pond in the neighbourhood of Paris. It was noticed that the fishes soon swelled and died, and on making a *post mortem* examination their livers and spleens were found filled with tubercle bacilli.

I have said as much as I may in the time allotted to me. I have endeavoured to show how the germ of tuberculosis is disseminated amongst us by carelessness, by ignorance, by apathy. I have tried to point out how rife the disease is amongst cattle. With due care a great deal can be prevented, and, what is still more hopeful, much of what now exists can be cured. An old physician used to say, "We have in riding as sure a specific for consumption as quinine is for ague, or mercury for syphilis." He was very near the mark. We would say rather, we have in pure air, good hygiene, and plentiful nourishment the key to the mystery that has baffled so many minds. We need no longer look upon early cases of tuberculosis so hopelessly, but frankly explaining everything to our patients win their confidence, and gain their support. We have looked to drugs in vain; they can do practically nothing to stem the ravages of this disease. It is

to the open-air life, the life in a well-directed sanatorium, that we must look. It is rational, it can be made scientific, and it is the only method of treatment that can stand criticism. I would go so far as to say that we are in England on the point of making a great stride in the treatment of tuberculosis, and one that will prove a national benefit. It would be a fitting close to this nineteenth century, which has been one of much progress, if we could take some definite steps to lessen the still enormous mortality from tuberculosis. It is individual men who move the masses, and it should be the duty of every medical man, who takes an interest in this subject, to use his own individual influence, his own special knowledge to further this crusade which has been begun under such auspicious circumstances. It is because I feel so strongly upon the subject that I have ventured to read this paper before you this evening.

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#### LAWSON TAIT.

ON June 13th, 1899, there died at Llandudno Robert Lawson Tait at the comparatively early age of 54. Although several biographical sketches have already appeared, we feel that we owe it to the memory of Mr. Tait as a former Editor of the *Birmingham Medical Review* to record in the pages of this journal our sense of his loss, and to preserve there some record of his life's work.

Lawson Tait was born in Edinburgh, on the 1st of May, 1845. He was admitted at the age of seven as a Foundation scholar to Heriot's Hospital, where he was educated. Winning a Scholarship, he became a student of the University of Edinburgh, and although he did not graduate there, he passed through the curriculum both of Arts and of Medicine. During his student days in Edinburgh, from 1860 to 1866, he worked under the immediate guidance of the late Mackenzie Edwards, a surgeon of great ability and promise. For some time he acted as assistant

to Sir Henry Littlejohn. He was, however, most intimately associated with the late Sir James Simpson, whose pupil he was and whom he assisted in his practice. Leaving Edinburgh, in 1867, with the qualifications of L.R.C.P., L.R.C.S., he was appointed House Surgeon to the Wakefield Hospital. During the three years that he spent there he had the opportunity of performing numerous surgical operations, including six ovariectomies. His first ovariectomy was performed on July the 29th, 1868, when Tait was only 23 years of age. In 1870, he came to Birmingham, having purchased a general practice in one of the suburbs. The same year he took his M.R.C.S. Eng., and his F.R.C.S. Edin. In 1871, he took his F.R.C.S. Eng. He did not continue in general practice for more than a few months. He took rooms with the late Dr. Bell Fletcher, and there commenced his life as a Consulting Surgeon. About this time a proposal was made for the establishment of a hospital devoted to the treatment of the special diseases of women. Mr. Tait took an active part in support of this movement, which was, however, strongly opposed by many of the leading medical men of the town. In spite of their opposition the hospital was founded, and in July, 1871, Mr. Tait was elected a member of the honorary staff, although he was only twenty-six years of age, and had not been resident in Birmingham more than twelve months. This event was undoubtedly the real commencement of his brilliant surgical career. He remained on the acting staff until 1893, when he was appointed Consulting Surgeon. By his marvellous surgical achievements he has shed lustre on the hospital and given it a world-wide fame.

On February 2nd, 1872, he removed an ovary for chronic abscess—the first occasion on which that organ had been deliberately excised for inflammatory disease. On August the 1st of the same year he performed for the first time the operation of removal of the uterine appendages for myoma. Both operations were successful and are landmarks in the history of abdominal surgery. Next year (1873) he was awarded the Hastings Gold Medal by the British Medical Association for his

thesis on "The Diseases of the Ovaries." During the same year he performed his first hysterectomy for myoma.

In 1877 he published a book on "Hospital Mortality," in which he denounced big hospitals for their high death-rate, and advocated the establishment of small cottage hospitals in their place. This led to an angry controversy in the local medical profession. About the same time he published a slender treatise on "The Diseases of Women." It was also in 1877 that he began to remove the uterine appendages for diseases of the fallopian tubes: on June 21 he removed a hæmatosalpinx.

In 1878 he published his first series of fifty ovariectomies, of which no less than 19 died. He was at this time operating with the spray and full antiseptic precautions. But even now he was beginning to distrust "Listerism," and to recognise the paramount importance of "scrupulous attention to cleanliness of every kind and in all directions." He now for the first time began to open the abdomen for the treatment of pelvic abscess.

The year 1879 was eventful. He performed his first cholecystotomy, removed his first pyosalpinx and hydrosalpinx, described his flap-splitting operation for repair of the perineum, and introduced his method of re-position of the inverted uterus, and also of dilating the cervix by means of continuous elastic pressure.

In 1880 he performed for the first time the operation of hepatotomy, and published his second series of fifty cases of ovariectomy, this time with only three deaths. This remarkable result he attributed to the fact that he had adopted the short ligature in place of the clamp for the treatment of the pedicle. He still reluctantly used the carbolic spray and immersed his instruments in carbolic lotion, but he had given up the complicated moist Listerian dressings for the wound and advocated and used simple dry absorbent Gamgee tissue.

In 1881 he was called by Dr. Hallwright to see a patient who was dying from internal hæmorrhage due to a ruptured tubal pregnancy. Dr. Hallwright suggested to Mr. Tait that he should open the abdomen, ligature the broad ligament, and remove the

ruptured tube. Mr. Tait, however, declined to act on this bold suggestion and the patient died. A *post mortem* examination of the case convinced him however that the operation was perfectly feasible, and he determined to try it in his next case. He performed his first operation for ruptured tubal pregnancy on January the 17th, 1883, and afterwards "by a remarkable series of successes placed it in the front rank of major life-saving operations." About this time he published a work on the "Diseases of the Ovaries," really an expansion of his Hastings Prize Essay. In 1884 he recorded his first thousand cases of abdominal section. In the following year he astonished the surgical world by publishing a series of 139 consecutive ovariectomies without a death. By this time he had finally abandoned all antiseptic precautions, and trusted to simple soap and water cleanliness, segregation of patients, and dry absorbing dressings. He was thus one of the pioneers of aseptic surgery. In 1886 he described for the first time the disease known as diabetic vulvitis.

In 1888 he delivered his epoch-making Ingleby Lectures on Ectopic Gestation. He was appointed Professor of Gynæcology at Queen's College.

The following year he published the first volume of his big text-book, "The Diseases of Women and Abdominal Surgery"—the second volume is still unpublished. In 1890, he became President of Mason College; delivered the address in Surgery at the Birmingham Meeting of the British Medical Association; and was awarded the Cullen and Liston Memorial Prize by the Edinburgh College of Physicians for his services to medical science. He took a very active part in effecting the transference of the Faculty of Medicine from Queen's College to Mason College, in fact the successful termination of the negotiations in 1892 was mainly due to his efforts. This transference contributed in an important sense to the ultimate possibility of founding a University of Birmingham. Towards the end of this year he was offered a Baronetcy by Mr. Gladstone, an honour, however, which he declined.

As an operator he was pre-eminent. His operations were

performed without the least appearance of haste, with marvellous rapidity and dexterity. He was seen at his best in a difficult case, such as a bad pyosalpinx, a big hysterectomy, or an ovariectomy with ugly adhesions. Though he encountered appalling difficulties, he proceeded silently, swiftly, and undauntedly towards a triumphant issue. He was fertile in expedients, and displayed a prompt resourcefulness in dealing with unexpected and desperate complications. He worked through the smallest possible incision, disturbed the tissues of the wound as little as possible, and ever sought after the quickest and most direct method of attaining his end. He used as few instruments as possible, and these were of the simplest character, for he abominated anything which was finicking or complicated.

In 1872 he was appointed Lecturer on Physiology and Biology at the Midland Institute, a post which he held until 1879. During this time his outspoken advocacy of Darwinism and the doctrine of Evolution gained him considerable notoriety and no little abuse. In 1879 he published a valuable paper on the minute structure of Pitcher Plants. He was one of the founders of the Birmingham Natural History Society.

Soon after he came to Birmingham he made the acquaintance of George Dawson, the brilliant clergyman, lecturer, scholar and journalist, who dominated the public life of Birmingham in the seventies. Mr. Tait joined the staff of *The Morning News* of which George Dawson was Editor, and many of the ablest of its leading articles were from his pen. Tait and Dawson were bosom friends until the sudden death of the latter, who powerfully influenced for good Tait's intellectual development. In 1876 he entered the Town Council, and he was appointed Chairman of the Health Committee. During this time he published papers on the disposal of town refuse, and the ventilation of public buildings. He finally ceased to be a Town Councillor in 1885.

In politics, Mr. Tait was a radical and a Home Ruler, and at the General Election of 1886, he unsuccessfully contested the Bordesley division of Birmingham.

He was the practical founder of the Medical Defence Union. He took an active part in establishing the British Gynæcological Society, and was elected President in 1886.

He was one of the promoters of the Birmingham Provident Dispensaries. When the Birmingham Medical Institute was started in 1874, Tait was one of its original members. He always took the most active interest in the welfare of the Institution, and was President from 1889 to 1893.

He was also President of the Birmingham Philosophical Society; of the Birmingham Natural History Society; of the Midland Medical Society; of the Birmingham Branch of the British Medical Association; of the Herefordshire and Worcestershire Branch of the British Medical Association; and of the Scottish Society.

He was ever ready to help young professional men who found the struggle for existence a hard one; and many who have now attained to success and affluence will remember with gratitude Tait's kindly assistance in the hour of need.

Mr. Tait took a great interest in Archæology, and wrote articles upon "Britain during the Stone Age," "The Orientation of Churches," "On Prehistoric Fortifications," and on "Monumental Brasses."

His chief amusements were driving, fishing, boating, and gardening. He never played games of chance or skill. He was an enthusiastic patron of the drama. He was a genial host, a clever and effective after-dinner speaker, and a witty *raconteur*.

Mr. Tait was LL.D. of the University of New York and M.D. Honoris Causâ New York, Albany, and St. Louis. He was also a member of several literary and learned societies.

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## DR. CROOKE.

THE death of Dr. Crooke will also be felt as a loss to the profession in Birmingham, where so much of his work was done, the more so as this work was in a large measure to blame for his ill-health. Dr. Crooke had contracted nephritis, as the result of scarlet fever, while working in the Leeds Fever Hospital. Later on, while pathologist at the General Hospital, severe septicæmia did much to undermine his constitution. More fitted for purely scientific work than practice, Crooke came to be better known among a few than to many, and one of the former, Prof. Sims Woodhead, writes :—

“Old Edinburgh men, especially those who graduated about the year 1880, will hear with great regret of the death of George Frederick Crooke. In recent years Dr. Crooke has been in poor health, but was nevertheless able to continue in practice. Many of his old friends had entirely lost sight of him, though all will remember with pleasure his great enthusiasm, his wonderful spirits, and the *verve* with which he carried out whatever he undertook. Crooke was not often looked upon as being a brilliant man ; he was, however, a man with great gifts, a splendid musician, a good conversationalist, genial, simple hearted, and absolutely straightforward. No one who knew him could but like him and appreciate his talents. Beyond this, however, he had one hobby in life—that was Pathology. He was never a successful physician in the sense in which the term is most often used, but his pathological work was of the very highest order.

“Some of his earliest investigations—carried out under Eberth of Halle—on the affection of the parotid and other glands in scarlet fever, and his demonstration of the microbes in these glands will always be associated with Dr. Crooke’s name. In addition to this, however, he had done much good work on Bright’s disease, and his work on catarrhal pneumonia, on interstitial hepatitis, and similar conditions, although never

published, was of an exceedingly high order. Many will regret his early death. It cannot but be felt that in a great measure his life's work was done, but all the same, the profession has lost a very valuable worker, and his old friends, of whom there are very many, cannot but feel poorer in friendship for his loss. They will feel that there has, indeed, passed away from amongst them, one of the brightest spirits and most genial and honest of men."

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#### THE PROPOSED CONSULTING INSTITUTION OF THE HOSPITAL SATURDAY FUND.

The Staffs of the General and Queen's Hospitals have held two meetings to consider the situation, and it was decided to approach the Lord Mayor with a request that he would endeavour to arrange a conference with the Hospital Saturday Fund Executive.

We print below the Minutes of these meetings. At the third of these, in addition to the Staffs of the General and Queen's Hospitals, all the consultants of the town were invited to attend, although owing to the failure to send out fresh notices to those who had been present at the previous meeting several members of the General and Queen's Hospitals were absent. There was a very numerous attendance of consultants, and as the object of the meeting was to endorse what had been agreed to at the previous meeting of the staffs of the two General Hospitals the result was to show unequivocally the united front presented by the consultants as a body.

*Minutes of Meeting of the Staffs of the General and Queen's Hospitals held in the Medical Institute on Thursday, May 18th, 1899.*

*Present*—Dr. Saundby in the Chair. Drs. Rickards, Carter, Simon, Foxwell, Suckling, Short, Russell, Stanley, Purslow,

Stacey Wilson, Kauffmann, and Thomas Wilson. Messrs. Chavasse, Bennett May, Heaton, Morrison, Priestley Smith, Lucas, Barling, Gamgee, Leedham Green, and Lloyd Owen.

A letter of apology was read from Dr. Malins.

The Chairman explained that the Meeting had been called at the request of several members of the staffs of both hospitals in order to consider the situation created by the recent decision of the Hospital Saturday Fund to create a Consulting Institution in Birmingham. After considerable discussion it was unanimously agreed that no consultant should undertake to see patients for a fixed salary, but any consultant is quite free to see patients for a fee of half-a-guinea; and it was further resolved to appoint the Chairman, Mr. Priestley Smith and Dr. Thomas Wilson as a Committee authorised to seek through the Lord Mayor an interview with representatives of the Hospital Saturday Fund. It was further resolved that the meeting stand adjourned to the call of the Chairman to receive the report from this Committee.

An adjourned meeting of the Staffs of the General and Queen's Hospitals to consider the proposed Consulting Institution was held at the Medical Institute at 4.30 p.m. on Friday, June 9th, 1899.

*Present*—Dr. Saundby in the Chair. Drs. Rickards, Carter, Simon, Foxwell, Kauffmann, Stacey Wilson, Purslow, Short, Russell, Stanley, and Thomas Wilson. Messrs. Bennett May, Barling, Haslam, Priestley Smith, Lloyd Owen, Marsh, Heaton, Morrison, Gamgee, and Leedham Green.

An apology for non-attendance was announced from Mr. Chavasse.

The Minutes of the last meeting were read, confirmed, and signed.

Dr. Saundby reported the proceedings of the Committee appointed at the last meeting, and stated that a meeting with the representatives of the Hospital Saturday Committee had been arranged to take place under the presidency of the Lord Mayor on Monday the 12th instant.

Dr. Saundby suggested that a general meeting of the profession in the City and neighbourhood be called for Monday the 19th instant ; and this was agreed to.

It was proposed by Dr. Simon, seconded by Dr. Stacey Wilson, and carried :—

That this meeting will agree to receive certificates from the delegates of the Hospital Saturday Fund, provided that they are safeguarded by such restrictions as are agreed to by our representatives at the Conference.

The conference was held at the Council House on Monday, June 12th, the Lord Mayor (Alderman Beale) being in the chair. Dr. Saundby, Mr. Priestley Smith, and Dr. Thomas Wilson represented the medical profession, while on the other side there were Alderman Cook, the Chairman of the Executive of the Hospital Saturday Fund ; Mr. Aston, the Honorary Secretary, and four other members of the Executive. On behalf of the medical profession it was stated that the proposed Institute was objected to on the following grounds :—

- (a) That it is proposed that non-medical employers shall exploit the services of medical men : in other words, shall employ medical men to earn fees, pay them by salary, and deal with the proceeds at their own pleasure.
- (b) That no restriction is proposed as to the class of persons to be received as patients, so that persons well able to afford the usual consultation fees would obtain a concession to which they have no claim.
- (c) That it is proposed to incorporate the Institution as a Limited Company to carry on the business of physicians and surgeons, and that this is contrary to the Bill which is before the House of Lords, entitled "An Act to amend the Companies Acts," which has received the support of the General Medical Council and the British Medical Association.
- (d) That such an Institution would assuredly seek to procure patients by advertising and canvassing in contravention of professional rules, and any practitioner holding service in it would render himself liable to the censure of the General Medical Council.

It was proposed to seek an alternative along the lines already traced by the Provident Dispensaries, and it was stated that the majority of Consultants in the town were willing to see patients of the working class for half-a-guinea if they could have

any assurance that the persons who asked for the reduction were in circumstances to require it. It was suggested that they might bring recommendations from their ordinary medical attendant, or where that was for any reason undesirable, a certificate might be given by some official of the Hospital Saturday Fund in the same way as hospital tickets and recommendations for Convalescent Homes are distributed. This proposal was reduced to writing and the draft approved by the medical representatives.

Two days later the Hospital Saturday Fund Executive sent the following note to the Lord Mayor who forwarded a copy to Dr. Saundby.

Hospital Saturday Fund, June 14th, 1899.  
The Right Honourable The Lord Mayor of Birmingham,  
Council House.

Dear Sir,

I beg to hand you herewith a copy of Resolution which was carried unanimously at the meeting of the Executive Committee of this Fund held last night.

Yours truly,  
(Signed) W. S. ASTON, Hon. Secretary.

Copy of Resolution referred to.

*Resolved*—That the Lord Mayor be respectfully requested to inform Dr. Saundby that the representatives of the Hospital Saturday Executive Committee duly reported the details of the discussion, which took place on Monday evening, and the offer of the medical gentlemen there present, and the Executive Committee desire to say that they would like to have the proposals before them in writing in order that they may be considered by the Executive Committee and the Committee to whom the subject has been referred.

To this Dr. Saundby replied :—

June 14th, 1899.

My Lord Mayor,

I am obliged to you for letting me see a copy of the resolution sent you by the Executive Committee of the Hospital Saturday Fund.

May I point out that Alderman Cook reduced our proposal to writing and that having read it out to us we agreed that he had correctly stated its terms, but perhaps I may quote the following passage from a paper I brought with me to the meeting :—

“We are in a position to state that there are many consultants in the town, in all, sufficient to form a large consulting staff in every department of medicine and surgery, who will see for half-a guinea any person belonging to the working class who is unable to pay the ordinary fee. We believe that if the Hospital Saturday Fund delegates would take upon themselves the work of certification in the same way as they now undertake the distribution of hospital tickets and the recommendations for convalescent homes, the medical profession would be perfectly willing to accept this arrangement on the honourable understanding that such certificates should only be given to proper persons.”

As however my colleagues and myself have no specific authority from the medical profession, I shall take the earliest opportunity to bring the matter before a meeting which I have every reason to believe will endorse the views I had the honour to lay before you on Monday night.

I am, My Lord Mayor, yours obediently,

ROBERT SAUNDBY.

The Right Honourable the Lord Mayor,  
Council House, Birmingham.

This suggestion met with the approval of the Lord Mayor as is shown by the following letter—

[COPY].

City of Birmingham, Lord Mayor's Parlour,  
The Council House, 15th June, 1899.

Dear Dr. Saundby,

I am much obliged for your letter.

I think the Executive Committee feel it necessary that whatever they put before the delegates should be with the

authority of the profession, which of course you were unable to give at our last meeting.

I have heard also that they are very anxious to know what Consultants will be available to them at the half-guinea fee if your suggestion is accepted. No doubt these particulars can be supplied at the meeting of the profession to which you refer.

I am, yours faithfully,

(Signed) CHARLES G. BEALE, Lord Mayor.

Robert Saundby, Esq., M.D., LL.D.

A meeting of consultants was held at the Medical Institute, on Thursday, June 15th, 1899, at 4.15 p.m.

*Present*—Dr. Saundby in the chair. Drs. Carter, Foxwell, Warden, Kauffmann, Lewis, Lamb, Leslie Phillips, Russell, Stanley, W. R. Jordan, Foxcroft, and Thomas Wilson. Messrs. Bennett May, Barling, Priestley Smith, Haslam, J. W. Taylor, Heaton, Eales, Wood-White, J. Jameson Evans, Wright Wilson, Gilbert Smith, Christopher Martin, Vinrace, Morrison, Gamgee, Smallwood Savage, and W. E. Bennett.

An apology was announced from Dr. Malins.

The minutes of the meeting of the Staffs of the General and Queen's Hospitals, held on the 9th inst., were read, confirmed, and signed.

The report of the Committee appointed to confer with the Hospital Saturday representatives was read.

It was agreed that a General Meeting of the profession should be called for Friday, the 23rd inst., at 4-15 p.m.

After some discussion, in which Messrs. Barling, Leslie Phillips, Priestley Smith, Vinrace, Lewis, Taylor, and Bennett took part, it was proposed by Dr. Saundby, seconded by Dr. Warden, and unanimously resolved :—

That this Meeting approves of the following propositions and agrees that they shall be submitted to the General Meeting of the profession to be called for the 23rd inst.

- 1.—That this Meeting of registered Medical Practitioners residing in or near Birmingham, objects to the proposed Consulting Institution on the following grounds :—

- (a) That it is proposed that non-medical employers shall exploit the services of medical men : in other words, shall employ medical men to earn fees, pay them by salary, and deal with the proceeds at their own pleasure.
  - (b) That no restriction is proposed as to the class of persons to be received as patients, so that persons well able to afford the usual consultation fees would obtain a concession to which they have no claim.
  - (c)\* That it is proposed to incorporate the Institution as a Limited Company to carry on the business of physicians and surgeons, and that this is contrary to the Bill which has passed the House of Lords, entitled "An Act to amend the Companies Acts," which has received the support of the General Medical Council and the British Medical Association.
  - (d) That such an Institution would assuredly seek to procure patients by advertising and canvassing in contravention of professional rules, and any practitioner holding service in it would render himself liable to the censure of the General Medical Council.
- 2.—That this Meeting records its opinion that no registered Medical Practitioner should take office in an Institution open to these objections.
- 3.—That this Meeting approves of the proposal submitted to the Executive of the Hospital Saturday Fund on behalf of the profession, viz., that many of the Consultants should agree to see Hospital Saturday patients for the reduced fee of half-a-guinea, provided that arrangements can be made for preventing abuse of this privilege.

A meeting of the medical profession convened to consider this question was held at the Medical Institute on the afternoon of Friday, June 23rd.

The following is a copy of the circular convening the meeting.

Birmingham, June 15th, 1899.

Dear Sir,

At a meeting of Consultants held this day, it was resolved to hold a meeting of the Medical Profession in the Medical Institute, on Friday, June 23rd, at 4-15 p.m., to discuss the proposed Consulting Institution and to submit to

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\* It shall be unlawful for a company to carry on the profession or business of a physician, surgeon, dentist, or midwife, and if any company contravenes this enactment it shall be liable, on summary conviction, to a fine not exceeding five pounds for every day during which the contravention happens.



the Meeting the subjoined Resolutions. It is hoped that as many Medical Practitioners as possible will attend.

I am, dear Sir, yours faithfully,

ROBERT SAUNDBY,

Chairman of the Meeting.

- 1.—That this Meeting of registered Medical Practitioners residing in or near Birmingham, objects to the proposed Consulting Institution on the following grounds :—
  - (a) That it is proposed that non-medical employers shall exploit the services of medical men : in other words, shall employ medical men to earn fees, pay them by salary, and deal with the proceeds at their own pleasure.
  - (b) That no restriction is proposed as to the class of persons to be received as patients, so that persons well able to afford the usual consultation fees would obtain a concession to which they have no claim.
  - (c) That it is proposed to incorporate the Institution as a Limited Company to carry on the business of physicians and surgeons, and that this is contrary to the Bill which has passed the House of Lords, entitled "An Act to amend the Companies Acts," which has received the support of the General Medical Council and the British Medical Association.
  - (d) That such an Institution would assuredly seek to procure patients by advertising and canvassing in contravention of professional rules, and any practitioner holding service in it would render himself liable to the censure of the General Medical Council.
- 2.—That this Meeting records its opinion that no registered Medical Practitioner should take office in an Institution open to these objections.
- 3.—That this Meeting approves of the proposal submitted to the Executive of the Hospital Saturday Fund on behalf of the profession, viz., that many of the consultants should agree to see Hospital Saturday patients for the reduced fee of half-a-guinea, provided that arrangements can be made for preventing abuse of this privilege.

There were present Sir James Sawyer, Drs. T. W. Brown, Parkes, Thomas Salt, Henton White, MacLean, Gibbs Blake, Parsey, Thomas Wilson, Garvey, Kauffmann, Carter, Adamson, Kirby, De Blaquiére, Dain, Leslie Phillips, Powell, Sturge, Huxley, Walter R. Jordan, Clark, Herbert Perry, Douglas Stanley, Melson, Short, James W. Russell, Lewis, Lamb, Warden,

Foxwell, Branson, Suckling, Nelson, McCardie, Line, Drury, Martin Young, Donovan, Foxcroft, Strathy, and Oswald Lewis. Messrs. John Tighe, Pooler, Boyton, Furneaux Jordan, Alfred Stanley, D. Llewellyn Thomas, Thomas Thomson, Robertson, Baldwin, Bennett, Weeks, Clarke, Haslam, Blakeney Lawrie, Wilkinson, Chadwick, Gifford, Pepper, Leedham Green, Priestley Smith, Griffin, Lunn, Round, Hancock, Bennett May, Campbell, Legge, Hall, Downing, Thompson, George Thomas Sutton, Johnson, Bygott, Mann, Turner, Elkington, Perry, Yuill, Murray, Buckley, Lydall, Smallwood Savage, Lucas, Sandison Crabbe, Wright Wilson, McCall, Wood White, Prosser, Garner, Newton, Trout, Morton, Gordon, John W. Taylor, Gilbert Smith, Chas. MacNaught, Wykes, Vokes, Burges, Oakes, Mothian, Leech, Eales, Milligan, Burton, Weston, Bodkin, Shillito, Marsh, Whitcombe, J. Jameson Evans, Harmar, Mackay, Christopher Martin.

Dr. Thomas Wilson announced the unavoidable absence of Dr. Saundby through illness.

It was proposed by Mr. Barling, seconded by Dr. Carter, and resolved—That Mr. Priestley Smith should take the Chair.

This having been carried, Mr. Priestley Smith took the Chair and opened the proceedings by calling upon Dr. Thomas Wilson to read the circular convening the meeting.

Letters and telegrams of apology sympathising with the objects of the meeting were announced from Drs. Savage, J. Ward, Fairley, Hollingshead, F. Vinrace, and C. E. Purslow, and from Messrs. Chavasse, Gamgee, Farncombe, Cox, Loxton, and Houghton.

The Chairman having explained the reasons which had made it necessary to summon the meeting, called upon Dr. Thomas Wilson to read the notes of the conference which had taken place between Dr. Saundby, Mr. Priestley Smith, and Dr. Thomas Wilson and six delegates of the Hospital Saturday Fund Executive, held under the Presidency of the Lord Mayor on June 12th.

These notes and the subsequent correspondence between the

Lord Mayor and Dr. Saundby having been read, the Chairman proposed the following resolution :—

1.—That this Meeting of registered Medical Practitioners residing in or near Birmingham, objects to the proposed Consulting Institution on the following grounds :—

- (a) That it is proposed that non-medical employers shall exploit the services of medical men : in other words, shall employ medical men to earn fees, pay them by salary, and deal with the proceeds at their own pleasure.
- (b) That no restriction is proposed as to the class of persons to be received as patients, so that persons well able to afford the usual consultation fees would obtain a concession to which they have no claim.
- (c) That it is proposed to incorporate the Institution as a Limited Company to carry on the business of physicians and surgeons, and that this is contrary to the Bill which has passed the House of Lords, entitled "An act to amend the Companies Acts," which has received the support of the General Medical Council and the British Medical Association.
- (d) That such an Institution would assuredly seek to procure patients by advertising and canvassing in contravention of professional rules, and any practitioner holding service in it would render himself liable to the censure of the General Medical Council.

This was seconded by Dr. Carter.

Clause C of this resolution was altered to read "the Bill which is now before the House of Lords" instead of "the Bill which has passed the House of Lords."

Upon the motion of Dr. Kauffmann, seconded by Dr. Nelson, Clause D was altered to read :—

That in the event of the proposed Institution seeking to procure patients by advertising and canvassing in contravention of professional rules, any practitioner holding service in it would render himself liable to the censure of the General Medical Council.

The resolution as amended was then put to the meeting and carried unanimously.

The Chairman then moved the following resolution :—

That this Meeting records its opinion that no registered medical practitioner should take office in an Institution open to these objections

This resolution was seconded by Mr. Barling, supported by Sir James Sawyer, Mr. Oakes, and Mr. J. Furneaux Jordan and carried unanimously.

Mr. Barling asked the Chairman to explain to the meeting what the position was of those who had represented the profession in the conference with the Hospital Saturday Fund delegates upon the matters raised by the third resolution.

The Chairman replied that the representatives had given no pledges and that the meeting was free to deal with this question as it pleased.

The Chairman then moved :—

That this Meeting approves of the proposal submitted to the Executive of the Hospital Saturday Fund on behalf of the profession, viz , that many of the Consultants should agree to see Hospital Saturday patients for the reduced fee of half-a-guinea, provided that arrangements can be made for preventing abuse of this privilege.

This was seconded by Mr. Barling.

The previous question was moved by Sir James Sawyer, seconded by Mr. Morrison and carried by a large majority, 70 hands being held up for it and 15 against.

After some further discussion, it was decided by a show of hands to continue the discussion of the general principles underlying the third resolution.

After remarks had been made by Messrs. Newton, Whitcombe, Morrison and Adamson, and Drs. Kauffmann, Melson, Carter, and Rickards, the following resolution was proposed by the Chairman :—

That this Meeting desires to remind the promoters of the scheme in question that many of the recognised consultants of Birmingham are in the habit of charging a reduced fee to those who satisfy them that the usual fee is beyond their means.

This was seconded by Mr. Barling and resolved *nem. con.* 75 hands being held up in its favour.

The meeting terminated with a vote of thanks to the Chairman.

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## REPORTS OF SOCIETIES.

### KIDDERMINSTER MEDICAL SOCIETY.

Meeting held on 26th May, 1899, Mr. E. H. ADDENBROOKE, President, in the chair.

Mr. J. Lionel Stretton showed :—1. A girl, aged 21 years, upon whom he had operated ten weeks previously for Tubercular Peritonitis. She walks about out of doors and expresses herself as quite well, the abdomen appears to be normal, and she has gained twelve pounds in weight. She has been taking creasote in doses increasing by  $\text{m}i$  each day, is now taking  $\text{m}60$  three times a day. On several occasions her urine became dark green in colour, but this always disappeared in a day or two without discontinuing the medicine. A portion of the omentum was sent to the Clinical Research Association, and they reported as follows :—“This tissue is infiltrated with an abundance of grey and caseous tubercles. The giant-cell systems are well developed.”

2. The Pyloric End of the Stomach with part of the duodenum removed from a man, aged 67 years. He had suffered from gastric symptoms for some months, and had been an in patient the early part of the year during which time he was thoroughly examined under an anæsthetic with a negative result. Although somewhat relieved by treatment, his symptoms soon returned when he went out. He chiefly complained of severe pain in the stomach, which was increased during the night, he stated that he had never had hæmatemesis, but that he vomited at times though this never occurred while he was in hospital, and he had lost flesh. The abdomen was opened in the middle line above the umbilicus, there was a considerable thickness of fat and the omentum was bulky. Tucked up beneath the liver was a large mass of growth involving the pyloric end of the stomach which was bound down by adhesions. After separating these it was

found that the growth involved the whole circumference of the organ, but the larger portion was on the lesser curvature. The whole of the disease was excised, which involved the removal of one-third of the stomach and an inch and a half of the duodenum. The stomach was closed with sutures, except the lower angle, which was joined to the duodenum with a Murphy's button.

He bore the operation well and passed a comfortable night, the next day he was quite himself and had rallied from the shock, but at 3 a.m. the following morning he had a sudden attack of cardiac failure and died in spite of all efforts to revive him.

Nothing was found *post-mortem* to account for death, the stomach was securely sutured and held water without leakage.

The chief points of interest were—1. The slight symptoms; 2. The negative results of abdominal examination due to the thickness of the wall and the position of the growth; and 3. The sudden death. Although attributed to cardiac failure, there was no evidence of its cause, and everything had been done to guard against it.

Mr. Oliphant read notes of a case of Pyæmia treated with antistreptococcic serum. The man, aged 23 years, was admitted with stiffness and swelling in the left side of the neck, which commenced two days previously. At first it was regarded as a case of inflammation of the lymphatics, but pyæmic symptoms soon developed. On 17th April and three following days he had an injection of serum 10 cc. There was not much effect upon his general condition, though the local symptoms were decidedly improved, and he died on the 24th. Mr. Oliphant considered that he was benefited by the treatment, and if it had been given earlier a favourable result might have been obtained.

Mr. W. Mills read a paper on "Adenoid Vegetations in the Naso-pharynx."

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## REVIEWS.

### A TEXT-BOOK OF OBSTETRICS.\*

THIS may be recommended as a very complete and reliable manual. There are perhaps a few opinions which the student would find ill-received by some Examining Boards, and it does not seem likely to displace the commonly-used English Text-books, but for reference it bids fair to be most useful, and bears the impress of being the well thought out conclusions of a practical obstetrician. As far as external considerations go the book is admirable; the printing is good and the numerous illustrations exceedingly well done; a few are old familiar friends, but the majority are new, and many reproductions of photographs of a very interesting nature. It was perhaps hardly worth while to include the series of photographs of a nude pregnant woman at various stages, the scientific interest is very small, and in this country at least medical practitioners do not find the inspection of the "altogether" a judicious part of the diagnosis of pregnancy. The coloured plates of the nipple and areola in pregnant and unimpregnated females do not strike one as being quite natural, and as living examples are so frequent they can scarcely be necessary; and the same may be said of the representations of the tints of the vagina and introitus. The student has little opportunity and the practitioner little desire to make researches into a physical sign upon which so much discredit has been thrown.

The author is fortunate in possessing a clear and lucid phraseology, but to our insular ideas the recurrence of such liberties with the English Language as "fetus," "fibers," "brunet," "goiter," produce the jarring effect of a false note. While

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\* A Text-book of Obstetrics. By Barton Cooke Hirst, M.D., Professor of Obstetrics in the University of Pennsylvania. London: The Rebman Publishing Company.

agreeing with Dr. Hirst's insistence that in many cases prevention is better than cure, we think that some of his ideals are very unlikely to be realised. The busy practitioner will learn with a shock that the patient's urine must be tested every fortnight during pregnancy and every week during the last month. It may well be considered that this would be as fruitful a cause of undue nervousness in the woman as annoyance to the doctor; and again, the medical man who insisted upon examining every patient six weeks after labour both digitally and with the speculum might easily find his services dispensed with on a future occasion. In the execution of his duty the obstetrician has to perform many unpleasant tasks, and it is too much to expect that on each visit he should satisfy himself of the condition of the lochia by means of the olfactory impressions conveyed by the patient's discarded napkin; this is "persecuting his vocation" with a vengeance. Surely the requisite information may be obtained from the nurse who cannot easily avoid knowing it. There is no rule without an exception, and unfortunately the pigmented patches on the face do not invariably disappear as stated, and moreover, in the few cases in which they do not they are very resistant to medication.

In speaking of the treatment of threatened abortion, the author, while giving due prominence to the virtues of opium and viburnum prunifolium, does not mention aletris; but in certain cases this remedy is of great value, and when it has recovered from the injudicious advertisements of an American firm and the glowing testimonials of United States M.D.'s with scant knowledge of the English language, will be more appreciated. It is asserted that normally the placenta is expelled with the foetal surface first, like an inverted umbrella, in cases left to nature, but there will be many who will still hold with Matthews Duncan that the edge usually presents. There does not appear to be any valid reason for absolute uniformity, considering the variations in position of the placental site. The Country practitioner who has to ride five miles to a case will not be comforted to read that if he aspires to be the perfect obstetrician, he must carry an electric battery in



his bag. With regard to anæsthesia in labour, chloroform is mentioned only to be placed on an inferior level to ether, which is to be administered by the open method. We imagine that this will not agree with the experience of most doctors; and cocaine, which is condemned as useless, nevertheless produces good effects in assisting the dilatation of a rigid os. It is recommended that ergot should be given as soon as the child's body is expelled. When this advice has been followed and the budding obstetrician has had to extract a placenta from the upper segment of an hour-glass contraction of the uterus he will probably be content for the rest of his life to wait until the secundines have been expelled. In the treatment of Postpartum Hæmorrhage, if kneading and compression of the uterus fail, it is advised to use ice, and if bleeding continues to plug with gauze, but hot water is much more likely to be obtainable and is more efficacious, and the injection of perchloride of iron solution is a less severe measure than the insertion of a tampon. It is said to be a mistake to turn the placenta so as to make a "rope" of the membranes, but Dr. Hirst does not explain his reasons for rejecting this simple and useful manœuvre; and again, that the placental end of the cord should not be tied so that the bulk being less it is more easily expelled. It is generally considered, however, that the increase in size is more than compensated for by the superior power which the uterus can exert upon it. These are only minor points upon which the opinion of many practitioners may differ from that of the author, but the general excellence of the book remains; the definite course of action prescribed to be followed in an emergency must be invaluable to the beginner.

## A SYSTEM OF MEDICINE, BY MANY WRITERS.\*

THE volumes of Professor Clifford Allbutt's System of Medicine, excellent as they have been from the outset, possess the happy quality of gaining progressively in interest and excellence. The sixth volume is certainly an instance in point, for not a few of the articles contained in it reach an exceptionally high level, and there is but little to be desired in the treatment of even the least important of the subjects. It deals with those diseases of the Circulatory System which were left over from the preceding volume, the diseases of the muscles, and the commencement of the diseases of the Nervous System, reaching, however, only the very outskirts of the latter subject.

The volume opens with a consideration of the valvular diseases of the right side of the heart, by Dr. G. Newton Pitt, who contributes a very original article based upon an exhaustive study of the *post-mortem* and clinical records of Guy's Hospital, and of the Museum specimens belonging to many of the London hospitals. Many of the results arrived at are very interesting, and amongst his conclusions may be especially mentioned the following:—(1) That there is evidence, both clinical and pathological, that in advanced cases of mitral stenosis the pulmonary artery not infrequently becomes distended, and the pulmonary valves functionally incompetent. (2) That rheumatism is the dominant cause of vegetations on the tricuspid valve. (3) That in every case of tricuspid stenosis examined but two, there was associated a stenosis of the mitral valve. All these points, it is hardly necessary to observe, tend to show that the part played by congenital disease in the production of right-sided valvular disease of the heart has been very considerably exaggerated.

Following a good account of Angina Pectoris by Sir Richard Douglas Powell, comes one of the most notable articles on

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\* A System of Medicine, by Many Writers. Edited by Thomas Clifford Allbutt, M.A., M.D., LL.D., F.R.C.P., F.R.S., F.L.S., F.S.A., Regius Professor of Physic in the University of Cambridge. Volume VI. London: Macmillan and Co. Limited. 1899.

Diseases of the Mediastinum and Thymus Gland, by Dr. F. T. Roberts. This article is too exhaustive for any account of its details to be given, and we must be content with saying that the treatment of this important subject is in all respects admirable. Professor Welch then contributes two long articles on Thrombosis and Embolism, which describe the large amount of fresh work that has lately been done on these subjects, and which must for the present take the position of a standard work of reference on the matters with which they deal. Mr. H. H. Clutton writes briefly on the subject of Phlebitis.

Dr. F. W. Mott then deals very ably with the Arterial Degenerations and Diseases. His article is highly original, and contains the result of his own observations in a large series of *post-mortem* examinations, the conclusions at which he arrives, though too numerous and complex for quotation, being worthy of the most careful study. Dr. Mott's article ranks with Professor Gairdner's description of Aneurysms of the Aorta, and with Dr. Roberts' article already mentioned, as in our opinion, the best in the volume. We should add that no better description of Aneurysm has been given than that contributed by Professor Gairdner. Dr. Rolleston concludes the section on the circulatory diseases with two short articles on Aneurysms of Arteries in the Abdomen, and Diseases of the Lymphatic Vessels.

The section on Diseases of the Muscles contains articles by Dr. Batten on Myositis, Dr. Hale White on Thomsen's Disease, Dr. Chas. E. Beever on Idiopathic Muscular Atrophy and Hypertrophy, and Dr. Aldren Turner on Facial Hemiatrophy and Hemihypertrophy. These articles all give excellent accounts of their subjects.

In the remaining part of the book an introduction to the study of the nervous diseases is to be found, and in this much attention has very wisely been devoted to matters which are generally rather scantily treated in books on the subject. Dr. Bevan Lewis first describes the General Pathology of the Nervous System, giving a full account of the recent work on the

elements of nervous construction, and the conclusions drawn from them which have done so much to revolutionise our views of nervous physiology and pathology. Professor Sherrington and Dr. Sharkey similarly treat very fully the difficult subjects of Tremor, the "Tendon-Phenomena," and Spasm. In these articles the present position of our knowledge is very ably summarised. After another good section on the Trophoneuroses, in which the Neurotrophic Affections of the Bones, Joints, and Soft Tissues, Adiposis Dolorosa, Raynaud's Disease and Erythromelalgia are described by writers who are all authorities on their respective subjects, the Diseases of the Nerves are dealt with; and of this section, probably the article on Peripheral Neuritis, by Dr. Judson Bury, and that on disease of the Cranial Nerves, by Dr. Aldren Turner, come first in order of merit. The volume closes with articles on Diseases of the Vertebral Column, Tumours, and Compression Palsies, by Professor Victor Horsley, and on Affections of the Spinal Meninges, by Dr. J. S. Risien Russell.

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#### THE DISEASES OF THE STOMACH.\*

"THE chief excuse for the existence of a book is individuality." Such is the opening sentence in the first section of this work. And we fully believe that so far as this work is concerned, its individuality is marked, as the authors have set before them the object of producing a treatise which should be at once practical and at the same time thoroughly complete. In this the writers have entirely succeeded. They have departed to some extent from the routine method of treating of disease of the stomach, for, as they point out, functional signs must not be regarded as the disease. Thus, there are no separate chapters on hyperchlorhydria, anachlorhydria, erosions of the gastric mucous membrane nor even dilatation of the organ. The term "dilatation" like "dyspepsia" has no precise meaning according to

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\* The Diseases of the Stomach. By William Van Valzah and J. Douglas Nisbet. London: The Rebman Publishing Co.

the authors, and they therefore prefer to consider the subject from another point of view. They employ the word "stagnation" and "retention" to denote the degree of motor insufficiency and to emphasise the fact that such motor insufficiency is a functional sign and not in itself a disease. The three characteristics of so-called dilatation of the stomach—its increase in size, the fact that it does not completely empty itself during the 24 hours, and lastly, does not retract when it is empty, taken together, are evidence of myasthenia, and a stomach which does not empty itself under ordinary circumstances in 24 hours is not necessarily enlarged, nor indeed, is its wall abnormally thin in all cases. This shows, therefore, that to consider "dilatation of the stomach" as a separate disease is not logical. The authors do not subscribe to the general idea that all dynamic affections of the stomach are neuroses. Many conditions described under this name are muscular, some glandular, while some are auto-intoxications. "Some are neurotic and some are dependent upon the diseases of the central nervous system, and of the various important organs of the body. A very few are possibly "neuroses" in the proper sense of the word. All these affections are dynamic. Such is their nature, and there is nothing else palpable in their manifestations. Such in outline is the method pursued by the writers in attacking the subject.

The third section deals with the different methods of treating gastric disorders, and many are the practical hints given therein. In reference to stomach washing it is stated that this remedy should be limited to three conditions; retention or stagnation of food and of digestive products; 2, retention of excessive secretions; 3, a rich and active germ growth. But it is stated in simple myasthenia with stagnation lavage is worse than useless where there is no gastric fermentation. If employed before the stomach is empty it removes a large amount of nourishment which would otherwise be delivered over to the intestines sooner or later, and if employed after evacuation is complete it can produce no good result, and in both cases it will stretch and irritate a weak muscle without any compensatory advantage to

the mucous membrane. It is otherwise when fermentation is present, and then the organ should be washed out before going to bed and left empty until morning. On the other hand, with myasthenia with retention, circumstances are altered, and under these conditions the stomach does not empty itself completely, and has not sufficient power to retract and thus a considerable amount of material is present in the stomach serving as a most suitable nidus for the growth of fermented organisms. Electrical treatment of the stomach is also fully described. On the other hand the conditions in which it may do harm are clearly set forth. Thus, it is harmful in acute gastritis and if in high degrees of density. Nor should electrical treatment be used during active digestion or in cases where there is hemorrhage, but its use in asthenia, gastric hyper-asthenia gastrica, and in certain cases of gastritis and ulcer.

After a careful description of the therapeutics of gastric disorder, the writers pass on to consider the dynamic affections of the stomach in which all conditions, such as neurasthenia gastrica, myasthenia gastrica, gastro spasm, incontinence of the pylorus, gastroplegia, and very many other conditions are described and with which the ordinary medical reader is probably unacquainted. The anatomical diseases of the stomach include various forms of gastritis, ulcer, growths and displacements. Very many views are given as to the Etiology of ulcer of the Stomach, but the authors do not seem to commit themselves to any very definite theory as to its causation. In about five per cent. of cases the ulcer perforates the gastric wall, coming in contact with adjacent tissues and produces encysted or purulent peritonitis. In section six the various effects of gastric disease on the other organs is pointed out. This probably is a subject which has been somewhat briefly considered by other writers. Here we have it gathered together in a continuous and definite form. Thus, auto-intoxication is described from the point of view of its effects on other organs, so that the reader is placed in a position to judge as to the propriety or otherwise of admitting a separate series of symptoms indicating the existence

of such a condition. It may be gathered from what we have said that this work is an extensive one. It points to considerable patience and careful collation of facts on the part of the writers, and although we may not be quite in accordance with some of their views, we feel that they have presented their material in a complete and striking manner, with the result that their work is likely to take a leading place in medical literature. We can safely say that the book contains a vast amount of useful information in its own special branch.

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#### GUY'S HOSPITAL REPORTS.\*

THE Fifty-third volume of the Guy's Hospital Reports contains ten papers of much interest, as well as a list of Preparations added to the Museum of the Hospital during the past year.

The first paper, contributed by Dr. Pye-Smith, is a thoughtful essay on the art of Diagnosis. Mr. Jacobson and Dr. S. B. Mesquita then describe a very interesting and curious case in which a recurring epithelioma of the neck, whose nature was identified after two operations by microscopical examination, disappeared without further interference. Mr. Jacobson is of opinion that the origin of a squamous-celled epithelioma in such a situation could only be found in the remains of one of the branchial clefts, seeing that the growth had no relation with the epithelia of the skin or the pharynx; and he gives a summary of several similar cases. Mr. Jacobson's conclusions from these cases will materially help in the diagnosis of growths arising in this unusual manner. A case is published by Dr. Frederick Taylor of Myelitis associated with Optic Neuritis, in which he discusses the nature of the association of these two conditions, and comes to the conclusion that they are

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\* Guy's Hospital Reports. Edited by E. C. Perry, M.A., M.D., and W. H. A. Jacobson, M.A., M.Ch. Vol. LIII., being Vol. XXXVIII. of the Third Series. London: J. and A. Churchill. 1898.

to be considered as due to the action of the same cause and bearing no relation of cause and effect to one another.

The paper by Drs. B. A. Richmond and Alfred Salter, the latter of whom holds the Gull Studentship in Pathology, is one of great importance. In it the authors give the results of numerous carefully conducted experiments on the nature of the various "pseudo-diphtheritic" bacilli, and their relation to the bacillus of Klebs-Loeffler. They come to the positive conclusion that all these bacilli are merely variants of one and the same organism and show that, although some varieties are generally innocuous to small animals, this is not always the case, and that many can be rendered virulent by transmission through successive inoculations. The writers lay stress upon the fact that the bacilli, though the immediate cause of the disease, are yet only one of a large number of factors in its production. Other papers on the subject of the infectious fevers are contributed by Mr. Gerald Sichel, who writes on Mediterranean Fever, and by Dr. T. Brice Poole, who gives an interesting and valuable summary of a series of cases occurring in the recent epidemic of typhoid fever at Maidstone. Mr. Hastings Gilford courageously reports three valuable cases of operation for unperforated gastric ulcer in which death occurred, and Mr. Newland-Pedley writes on the subject of Projecting Upper Front Teeth and their treatment.

Mr. G. Bellingham Smith discusses the question of the Functional Efficiency of the Retained Testicle, reviewing the literature of the subject, and recording some microscopical examinations of his own. His main conclusions are that the undescended testicle before puberty is unduly small and shows evidence of developmental defect, whilst at puberty it increases in size, but still is developmentally imperfect. In one recorded case formation of spermatozoa was observed, but this is the only case on record in which actual observation has established the efficiency of the organ. On the other hand, not a few cases give some evidence of efficiency by the occurrence of pregnancy in the wives of men suffering from double retained testicle. Finally,



Dr. Salter records the results of experiments on the Action of Normal Serum upon the Animal Economy, in which he concludes that two series of substances are present in normal blood serum, one of which is beneficial, and the other harmful to the economy of the animals experimented upon.

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### AN AMERICAN TEXT-BOOK OF DISEASES OF THE EYE, EAR, NOSE, AND THROAT.\*

THIS work, consisting of three parts in two volumes, is one of the "American Text-book" series published by the Rebman Publishing Co., and is sent out in their usual style, well-bound, printed on good paper, and the type of a size and character which makes it easily readable.

It is written in sections by numerous authors. The "collaboration method" need hardly be discussed here, but it has the advantage that each section can be written by an author who has made special investigations in the subject treated of in his section, and also the "student gains the point of view of a number of teachers." Though we would rather see special works confined to their own speciality, still the close relationship of the eye and the nose in a number of pathological conditions is an excuse for bringing out a work which comprises both these specialities.

The first volume is devoted to the eye, and the contents are well arranged. After the embryology, anatomy, and histology of the organ has been discussed, the general physiology of vision, general optic principles, methods of examination, the use of the ophthalmoscope and the means of determining the refraction of the eye receive due attention, followed by a systematic discussion of the diseases of the various parts of the eye, their

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\* American Text-book of Diseases of the Eye, Ear, Nose, and Throat. Edited by G. E. de Schweinitz, A.M., M.D., Professor of Ophthalmology in the Jefferson Medical College, Philadelphia, etc., and B. Alex. Rendall, M.A., M.D., Ph.D., Clinical Professor of Diseases of the Ear in the University of Pennsylvania, etc. London: The Rebman Publishing Co. Ltd.

pathology and treatment. The numerous operative procedures in connection with the eye are shortly described. There is an appendix containing useful chapters on subjects not usually treated of in the text-book, *e.g.*, The Standard of Form and Colour-vision required in Railway Service, The Röntgen Rays in Ophthalmic Surgery, and The Practice of Ophthalmic Operations on animals' eyes, etc.

Volume ii. consists of Part 2 on the Ear, and part 3 on the Throat and Nose. In Part 2 the anatomy and physiology of the ear are dealt with in short concise sections, well illustrated by drawings from preparations made by known authorities. The various methods of examining patients are described and suggestions made for case taking. We dissent from the statement that the examiner should always use the same eye, as he will find it much to his advantage to have both eyes equally well trained for the work.

In the paragraph on the causes of suppuration of the middle ear it is pointed out how many cases arise during attacks of measles and scarlet fever; we wish stress had been laid on the importance of routine daily examination of the ears in these cases, and also on the daily performance of the toilet of the nose and naso-pharynx by the aid of mild antiseptic lotion, as we feel sure if this were carried out from the onset of the attack without waiting for symptoms to appear there would be fewer cases of ear trouble in connection with the exanthemata. The diseases to which the organ of hearing is liable are treated of in a systematic manner, beginning with affections of the external ear and leading on through the middle ear to the internal ear and the auditory nerve. The more serious complications of middle ear suppuration, such as cerebral abscess, sinus, thrombosis, and meningitis, are shortly described, and this part of the work closed by a description of operations; these have been brought up to date, including the latest of Schwartze, Zaufal, Stacke, and others, for throwing the mastoid antrum, the attic, the tympanic cavity, and the external meatus into one large cavity for the purpose of arresting suppuration.

Part 3 opens with the embryology of the nose, pharynx, larynx and trachea, the anatomy of these structures is next described, and here some useful illustrations are inserted, especially of the nasal chambers, taken from Zuckerkandl's well known work and others, then follow the physiology in brief, the general etiology and pathology of diseases of the upper respiratory tract and the general therapeutics and prognosis have a section allotted to them.

The diseases and pathological conditions of the nose and throat are taken up and dealt with systematically and in order, due space being given to the accessory cavities of the nose to which much time and thought have been given of late years by rhinologists. The plates showing the methods of transilluminating the sinuses for diagnostic purposes are worthy of attention.

The last section of the book deals with the neuroses of the upper air passages, the production and hygiene of the voice and a short description of the operations on the throat and nose. The whole work contains many excellent illustrations and coloured plates, and as there is a great amount of useful information comprised in a comparatively small compass, the two volumes should form a valuable addition to the library of the practitioner and the student.

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#### ANIMAL SIMPLES APPROVED FOR MODERN USES OF CURE.\*

To make a tincture of bees, first catch the bees and irritate them, cut them in half under chloroform, macerate with glycerine, and bottle them up with spirit. Such a tincture, when taken in full toxic doses by "healthy provers" has caused symptoms diffused over the skin and mucous membranes similar to those produced locally by the sting of a bee. Hence, ten drops of the tincture "reduced to first decimal strength," is of great value

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\* *Animal Simples Approved for Modern Uses of Cure.* By W. T. Fernie, M.D. Bristol: John Wright and Co. London: Simpkin, Marshall, Hamilton, Kent and Co. Ltd. 1899.

for obviating erysipelas, especially of the head and face, likewise for relieving a puffy sore throat with much loose swelling about the tonsils—especially that kind of sore throat wherein a watery swelling spreads over the tonsils with a brilliant redness, looking as if the bee had flown in and stung the sufferer there—also for dropsy of the limbs which has followed a chill, or is connected with passive inactivity of the kidneys.

Similarly, the venom of certain spiders has been taken with the result that great restlessness has been provoked. Hence it will surprise no-one to learn that a tincture of spiders is of service in the treatment of St. Vitus' dance; though why it should also, in a high dilution, be a great remedy for malignant carbuncle, as well as diphtheria of the worst form, we are not able to ascertain.

Of the medical value of this book a fair idea may be gathered from these nearly literal quotations, but it is only just to add that the part played by "medicine" is a comparatively small one, and that not a little entertainment of a legitimate sort is to be obtained from its perusal. Like the same author's "*Herbal Simples*" it contains much curious and interesting information on the natural history of its subject, and deals with many curiosities of medicine as practised in the past. Dr. Fernie has gathered together from all sources a quaint collection of extracts from ancient medical works, and the only point to be desired is that we might be able more clearly to ascertain how much of the preposterous prescriptions of older times he is willing to accept. To place side by side the treatment of goitre by thyroid gland and the eating of the hearts of lions and tigers for the acquirement of courage, seems a little far-fetched for even the best homœopathist. But we fancy that Dr. Fernie is not above indulging in an occasional joke at the expense of his audience.

It must be admitted that Dr. Fernie knows how to write very readable English. His book is a really entertaining one, and worth reading for its good stories and quaint humour.

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**THE HYGIENE OF THE MOUTH.\***

THIS little book has little to recommend it to the Dentist, it is clearly printed, but the amount of useful original matter is very small. There may be points of interest to the medical practitioner whose time is too fully occupied to give much to an exhaustive Dental work, but the whole thing is decidedly elementary and does not open new ground. The chapters on Children's Teeth are mainly made up of tables and statistics, which prove little, and the treatment occupies a small share of the whole. Strong emphasis is laid on the fact that children's teeth require great attention, and here one agrees with Mr. Pedley. The chapters dealing with the mouths of adults show no originality of treatment or cases presenting themselves; the usual every day practice of dentistry will show quite as interesting records. There are a few useful prescriptions which may help the practitioner who gives attention to this matter. The illustrations are clear. It is to be regretted that Mr. Pedley has not approached his subject in a more scientific light, and given the Dental profession a work which can be regarded as a "Text-Book." Dental literature has not had very much attention paid it, and students find difficulty in acquiring simple knowledge at the present time.

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**THE EXPLORATION OF THE URETHRA AND  
BLADDER.†**

IN his preface the author states that this book is a sort of second edition, in English, of a pamphlet published in German twelve years ago. Dr. Tuchmann has evidently studied the configuration of the bladder and urethra with the greatest possible

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\* The Hygiene of the Mouth. By R. Denison Pedley, F.R.C.S. and D.S. Eng.

† The Exploration of the Urethra and Bladder. By M. Tuchmann, M.R.C.S. Eng., M.D. Wirzburg. With 26 Illustrations. Pp. 54. London: H. K. Lewis.

industry, and has made many experiments on himself, on patients, and on the cadaver, and he has, it is clear, as the result of this study, gained a great practical knowledge of the interior of the bladder. By means of this knowledge he shows in his book that he is able by means of a special pair of forceps to close the orifice of one ureter and so achieve that most desirable object, the collection of urine which has been secreted by one of the kidneys only. The book is interesting and, as we have said, proves the author's skill, and is evidently the result of work extending over many years.

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#### INDEX CATALOGUE OF THE LIBRARY OF THE SURGEON-GENERAL'S OFFICE, U.S. ARMY.\*

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#### New Books, etc., Received.

From Charles Griffin and Co.—

Official Year-book of the Scientific and Learned Societies.

The Diseases of Children. By GEORGE ELDER, M.D., and J. S. FOWLER, M.B.

From Baillière, Tindall, and Cox—

Aids to the Treatment of Diseases of Children. By J. McCaw, M.D.

Aids to the Analysis of Food and Drugs. By T. H. PEARMAN and C. G. MOOR.

From the Rebman Publishing Company, London—

The Care of the Baby. By J. P. CREZER GRIFFITH, M.D.

A Text-book of Pathology. By ALFRED STENGEL, M.D.

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\* Index Catalogue of the Library of the Surgeon-General's Office, U.S. Army. Second Series. Vol. iv.

- From H. J. Glaisher—  
 Clinical Lectures on Neurasthenia. By THOMAS D. SAVILL, M.D.  
 The Treatment of Hæmorrhoids and Rectal Prolapse. By DUDLEY  
 WRIGHT, F.R.C.S.
- From Young J. Pentland—  
 Aseptic Surgery. By CHARLES BARRETT LOCKWOOD, F.R.C.S.  
 Edinburgh Medical Journal, Vol. v.
- From the Medical Publishing Company—  
 Pyorrhœa Alveolaris. By JOHN FITZGERALD, L.D.S.
- From H. K. Lewis—  
 Text-book of Ophthalmology. By ERNEST FUCHS.
- From John Wright and Co., Bristol—  
 Our Baby. By Mrs. LANGTON HEWER.
- From Messrs. Longmans, Green, and Co.  
 A Manual of Surgical Treatment. By WATSON CHEYNE F.R.C.S.,  
 and T. F. BURGHARD, F.R.C.S. Part i.
- From John Bale and Sons—  
 "Selby." By EPPIE FRAZER.
- From the Government Printing Office, Washington—  
 Experimental Study of Children. by ARTHUR MACDONALD.
- Presented by the Author—  
 The Temples and Ritual of Asklepios. By R. CATON, M.D., F.R.C.P.
- We have also to acknowledge the following—  
 Some aspects of the Mental Discipline associated with the Study of  
 Medicine.  
 General Hospital's Statistical Report of In-patients.  
 Traumatism of the Eyeball. By C. D. WESCOTT, M.D.

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THE  
BIRMINGHAM MEDICAL REVIEW.  
AUGUST, 1899.

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ORIGINAL COMMUNICATIONS.

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ON THE CONDITION OF SLEEP IN EPILEPTIC  
PATIENTS.

FROM THE NOTES OF THE LATE JAMES RUSSELL, M.D., F.R.C.P.,  
LATE PHYSICIAN TO THE BIRMINGHAM GENERAL HOSPITAL.

EDITED BY JAS. W. RUSSELL, M.A., M.D., M.R.C.P.

[The following communication follows the lines of a paper found, together with many others on the subject of epilepsy, amongst the notes of the late Dr. James Russell. The editor has done little but re-arrange and re-write certain portions of the paper.]

AN alteration in the facility of obtaining sleep, though by no means a necessary attendant upon epilepsy, is yet one of its frequent symptoms or effects, coming on in some cases coincidentally with the onset of epilepsy, in others later in the course of the disorder. The change in the patient's habits in this respect is often a very marked one, whilst in not a few cases a condition of disturbed sleep is in very marked association with the time of the occurrence of the several fits, the sleep becoming natural again after these have passed away.

It is further to be noted that the condition of sleep sometimes affords a very delicate test, both of the presence of morbid conditions of the nervous system, and also of the extent to which



unhealthy influences are at work to produce such conditions. Hence, for example, the share which is taken by the various emotions in the causation of epilepsy may be revealed by the condition of the sleep, and the latter may also be taken as an indication of the extent of the effect which such morbid influences are exerting.

It need hardly be added that the relation of disturbed sleep to epilepsy goes farther than this, for it is likely to become in itself one of the factors in maintaining and increasing the disorder. It must therefore be reckoned with in many cases as one of the causes, and not infrequently a removable cause, of epilepsy.

Of 140 cases in which inquiry was made on this point, sleep was stated to be good, or at least not materially faulty, in 50 ; it was imperfect, or very much disturbed in 90. Of those patients whose sleep was disturbed, a large proportion (34) distinctly stated that a marked change in this particular had taken place since the fits commenced.

In 13 of the latter cases the connection between the epilepsy and disturbed sleep was especially direct, the patients having noticed the dependence of the disturbance on the occurrence of particular fits. Thus, one has very little sleep when the fits "are about," but sleeps well at other times ; another cannot sleep after the fits, cannot rest in bed, and generally lies awake all night ; whilst a third—a marked case of sleep-walking—sleeps badly only when the fits are about, at which time he dreams and "wanders." A few other examples may be added :—A patient said, "When the fits follow me up I am quite unable to sleep, and I get up early in the morning ;" another sleeps well before the fits, but after they have occurred she sometimes does not get any sleep for many nights. One patient does not sleep during the presence or approach of the fits, so that wakefulness has become a sort of warning to her ; and another slept well till she became subject to fits, though her sleep is now always very bad just before their occurrence or just after. And so with others.

One or two cases have, however, been met with, in striking contrast with those just narrated, in which the sleep was unusually profound during the prevalence of the fits. In one, the patient slept longer and more heavily than usual during the time that the fits were about: in another, the first week after she had suffered from fits, sleep, which was ordinarily disturbed, became sound; and two other patients slept very heavily before the fits came on.

In the second group of cases of which illustration is forthcoming, the disturbance of sleep has a very difficult significance. These are cases in which the patients have been subjected for a lengthened period to anxiety or trouble, or in which they have suffered some very intense mental impression. Such cases form a not inconsiderable part of the group of bad sleepers in epilepsy. The evidence of the effects of the mental influence is very direct, and in many it is of a marked description; and, as already stated, the disturbance of sleep may in these cases especially afford some indication of the severity with which the unhealthy influence is affecting the patients.

Thus, the nocturnal alarms of a little girl, who had been frightened by being knocked down by a cab, and whose epileptic fits were ascribed to this accident, were very graphically described by her mother. A woman who had suffered intense alarm from the unfounded report of her brother's death suddenly communicated to her, and who dated both her fits and her bad sleep from this occurrence, declared herself to have been "half in the world and half out" after the fright; she saw the supposed dead man in her sleep, and thought constantly of the fright. Before this happened, she slept well, but now she has frequent dreams, and wakes in fright with violent palpitation. Again, a little girl, who had been shut up in a dark cellar, and had been greatly terrified, had an epileptic fit two days later. From this time her sleep became greatly disturbed, and she suffered much from dreams, whilst the fits became of more frequent occurrence.

With respect to the influence of anxiety, the testimony is as direct and strong. The patients describe in forcible language

their lying awake sometimes for a whole night thinking of various things. A woman used to dream of her trouble; she had frights and saw phantoms, and was seriously disturbed when she had to refer to her grief. Another woman, who had been unfortunate in her business for several years, had many bad debts, and had lost a good deal of money, used to think of her anxieties very much at night, especially when alone, and dreamt badly about her affairs. She used to wake in a fright and see things around her, but was too much alarmed to recognise any special object. A man who had suffered much from trouble from pecuniary difficulties, stated that he used to lie awake: his nights, he said, were perfectly dreadful, and he "was no good for anything when he got up." Another man, who had had serious family troubles, tried to keep himself from thinking of them at night, but was unable to do so; he used to lie awake, or if he fell asleep was disturbed by dreams. All these patients suffered from epilepsy.

There is yet another group of bad sleepers in epilepsy which deserve a brief notice, namely, those whose temperament and mental balance are so unstable—whether from original constitution or as a result of education—as to predispose them to fall into disorder on slight provocation. Accordingly, a considerable number of the patients whose cases have already been quoted have exhibited a morbid sensitiveness or excitability, independently of the special disturbing influences to which they had been exposed; whilst in others no special circumstance had occurred to which the uneasy sleep could be referred, but yet the nervous and mental constitution was such as easily to convert the daily worries or duties, or even the pleasures of life, into influences of a disturbing character.

Some of these patients are described as being very irritable or excitable, and others have manifested an unhealthy tendency to carry their day's work into their dreams. Thus, "if anything special occurs by day, he is sure to dream of it at night;" "things trouble her much, she is very anxious about her work

and vexed if it is not well done, and she worries about it in her sleep ;" "she is always anxious at night if anything is to be done next day, and her night's rest is disturbed in consequence ;" "he used to talk of his lessons in his sleep, and has fussed about them and has not slept well." Such are some of the statements made in connection with a history of disturbed sleep by epileptic patients.

A tendency to dream was especially mentioned as being present among a considerable number of epileptics who suffered from bad sleep, and in some very graphic descriptions were given of behaviour during sleep, attesting such a tendency. The patients are stated to talk, to "moither," to shout, to cry, to moan, to ramble in their sleep ; or, as in one case, to "lie talking and moithering and worriting in his head." Or, again, they may wake in terror with eyes glistening and heart beating.

But many patients were carried beyond this stage into a condition of more violent dreaming, and sometimes of sleep-walking ; and thus a comparison may be drawn between the normal condition of dreaming, the less normal condition of sleep-walking, and the decidedly morbid condition of delirium, and also that of those singular automatic acts which are sometimes performed during and after an epileptic fit. A few examples may be quoted.

A woman, in the habit of waking in alarm from frightful dreams, often found herself out of bed when she came to herself. A girl started up from bed declaring that she saw men getting in at the window and on to the floor of her room ; her eyes were wide open all the time, and she remained in this condition for several hours. The same thing was repeated on another occasion. A woman, aged 31, who had had fits from childhood, said that she used to get up in the night in her sleep awfully frightened, until someone followed her and brought her back. She would walk into the street, and has sometimes gone a street's length ; "has got up, lighted the fire and got breakfast, all in her sleep." She had, at the time of speaking, been free from

these nocturnal disturbances for several years, but it was the fact that she had again risen in her sleep and opened the window that caused her to seek advice. Another woman, whilst suffering from epilepsy used often to be out of bed for half-an-hour or more, chiefly employed in carefully tucking it up ; or she would leave her bedroom and go to her sister who slept in another room.

The following case shows this disorder in its more serious shape :—A woman, subject to epileptic attacks, dreamt that her child was not her own and went downstairs hoping to find someone to keep it, but failing to find anyone she returned to her own room thinking how foolish it was to maintain the child. She accordingly opened the window and was “considering” about throwing it out, when someone came into the room at the critical moment.

On comparing cases of epileptic delirium and mania with the present cases it appears that no special relation exists between the occurrence of delirium and a tendency to bad sleep. In each division, whether that of good or bad sleepers, there are numerous cases of delirium, and pretty much the same proportion of severe cases or of cases in which the mental disorder has been of frequent occurrence.

The value of such information from the point of view of treatment is considerable, for amongst the diverse means of obtaining relief from epilepsy, one of the most important is to secure for the patient the benefit of sleep. In conclusion, a few illustrations of the good effect of measures directed towards this end may be quoted.

A woman, aged 30, had been for years the subject of brutal treatment at the hands of her husband, who had, however, recently died. About a year before this event she began to suffer from epileptic fits, which had continued to recur at the rate of three or four a week, or even in a day. At the time of her first attendance at the Hospital she was in a state of complete mental prostration, and it was almost impossible to get

anything out of her except in a private room and with much patience. She was exceedingly emotional, and any excitement caused a fit. Her sleep was greatly disturbed: she laughed, cried, sang, and prayed with the greatest volubility, and awoke in a highly excited condition. The treatment adopted\* included amongst other measures, 3 ss. of Tinct. Cannabis Indicæ given each night. Amendment in all particulars speedily manifested itself; her sleep became much better, her mental condition improved, and her fits occurred about once in five weeks. Morphia was then substituted, and a report four months later bore ample testimony to the continuance of her improvement.

A boy, aged 18, had been subject to epileptic fits for about three years, the fits occurring only during sleep. They generally happened about once in a fortnight, but sometimes occurred at the rate of one or more in a single night. Up to the time when the fits first set in his sleep had been very sound, but ever since it had been greatly disturbed. After three or four hours' sleep he would wake up with glistening eyes, pallor, and perspiration, and it was some time before he could be made to understand where he was, and even three or four hours before he could compose himself to sleep again. Tinct. Cannabis Ind. was ordered in 15 minim doses every night, but he took it for three weeks without benefit. Morphia (gr.  $\frac{1}{4}$  every night) was then substituted, and from that time his sleep, and with his sleep his general condition, underwent a progressive improvement. He now passed more than two months without a fit, and then six months. Twelve months after his first application, having omitted his medicine for four months, the fits returned, being preceded by renewal of the bad sleep. Morphia was not now successful, and Pil. Saponis Co. was therefore put in its place. In about a month after the return of his symptoms sleep was fully restored, the fits were diminishing in frequency, and he ceased to attend.

A boy, aged 16, had been liable to epileptic fits for 2  $\frac{1}{2}$  years,

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\* These cases probably occurred before the introduction of the bromides in the treatment of epilepsy.—Ed.

at the rate of two or three a week. He was very irritable, but his bodily and intellectual health had not suffered. Since the fits began he had been noticed to talk a great deal and to become excited in his sleep. He was ordered Tinct. Cannabis Ind., 15 minims, three times a day, which treatment was followed by marked improvement in his sleep, whilst a diminution began to be noticeable in the frequency of the fits. The dose of the tincture was subsequently raised to 25 minims. Five months after the treatment had been begun, he had only one fit in seven weeks. Sleep continued much improved, but the fits had not quite ceased to occur at the end of a year, when he gave up attending.

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## EXPERIMENTAL STUDY OF CHILDREN.

BY ARTHUR MACDONALD,  
THE UNITED STATES BUREAU OF EDUCATION.

### I. INTRODUCTION.

Before entering upon the introduction proper, the author may be allowed a few remarks. The original part of this work is chiefly a study of Washington school children; the rest is, in the main, an endeavour to present results of the principal investigations on school children up to the present time.

As to the original part of this study the reader will remember that all such work is in its infancy, and must therefore be necessarily incomplete.

Many seemingly unimportant details are given, but, as remarked later on, to present too many details is less of a mistake than to present too few.

It is hoped that this, with the work of others, may aid in a more thorough study of children, on whom the future civilisation depends.

### ANTHROPOMETRY.

Anatomical measurement of children is one of the chief branches of anthropometry. Anthropometry is the measurement

of the human body in general. It is a branch of anthropology, but independent in its purpose and methods.

ARTISTS THE FIRST ANTHROPOMETRISTS.

In early times measurements of the body were made in the service of art. It is in comparatively recent times that anthropometry has taken a scientific direction. The artist was interested almost wholly in the form and proportion of the human body, and so measured those only who were well formed. The empirical investigator is interested in the measurements of all persons. The founder of this latter branch of study is the Belgian statistician, Quetelet. His purpose was to find what is typical in man, at the same time making note of the variations due to sex, age, race, and social position.

PRACTICAL NATURE OF ANTHROPOMETRY.

One of the practical aims of measurements of living men is to identify personality. It is to give to each individual a "positive, permanent, and invariable personality." Thus, when a life insurance policy or a certificate of death is to be drawn up, or when it is desired to identify some insane person or some one disfigured by sudden or violent death, by shipwreck or combat, it would be serviceable had those persons had their measurements recorded so that they could be identified with certainty. Banks and associations for mutual benefit could not be so easily swindled by the assertion of the death of a policy holder; impersonation of a pensioner or of an heir would be difficult, and "those who died in battle would not have a nameless grave."

BERTILLON SYSTEM OF MEASUREMENT.

This is an extension of the idea of the Bertillon system of measurements for criminals—a system which aids in lessening crime. Crime is encouraged from the difficulty of distinguishing one person from another, so that habitual and professional criminals escape punishment.

This system, although intended primarily for a practical end, can be made of scientific value as far as it goes. Its measurements are length and width of head, distance between zygomatic



arches, length of left foot, of left middle finger, left little finger, left forearm, and length and width of ear. There is a descriptive part including observation of the bodily shape and movements. Deformities, peculiar marks on the surface of the body resulting from disease or accident, and other signs, as moles, warts, scars, tattooings, etc., are noted. Experience has shown that absolute certainty of identity is possible by the Bertillon system. But the full benefits of a practical system of identification can not be reached unless applied to all individuals. There might be at first sentimental objections, as has happened in things subsequently of great utility to society. No one who intended to be an honourable citizen would have anything to fear, but, on the contrary, it would afford protection to humanity in enabling society to find its enemies. This certainty of identification would discourage dishonest voting, assist in recognising deserters from the army, in enforcing laws, and in facilitating many business matters.

#### IMPORTANCE OF MEASUREMENTS OF CHILDREN.

In the investigation of normal modern civilised man, the most important branch is probably the study of children. The importance of taking physical measurements of children in school lies in the fact that such measurements may be considered as a test for systems of physical culture. As pupils are examined periodically to test their mental growth and improvement, it is just as necessary for their welfare that their physical condition and development be ascertained, so that progress may be gained in body as well as in mind. But there must be some standard by which we can measure physical development and growth. This can only be ascertained by taking measurements of a large number of children of all school ages. Although the physical conditions upon which the activity of mind depends are so complex, and so much is still unknown, yet it can be said with almost a certainty that at those ages in which children grow rapidly there should be a corresponding reduction in the amount of study required, and this should be done even if the pupil is

mentally capable of doing more, for no pupil should be developed in mind to the detriment of bodily conditions. The bright scholar, whom parents are too often inclined to push, needs it the least, especially if his physical condition is inferior to his mental. The saying that apples which ripen slowest last the longest is as true as it is homely. The systematic collection, then, of physical statistics in the public schools will furnish valuable facts for the hygienist and the educator.

#### NORMAL MAN SHOULD BE STUDIED.

Students of anthropology have confined their attention largely to uncivilised and prehistoric man, and consequently there is very little knowledge of modern civilised man, as compared with his less worthy predecessors or contemporaries. We know more about rocks and brutes than about modern man. We have made sciences of the two former, but a science of the latter hardly exists. The men who have begun lately to study modern man have given the abnormal types, such as criminals, the insane, inebriates, paupers, etc., the advantage of their investigations. It is time that similar investigations should be made upon average normal men, who are the foundation of every community.

Also men of talent, great talent or genius, should be studied; for if it is important to study the criminal in order to find the causes of crime, and thereby prevent or lessen it, it is perhaps more needful to investigate the man of talent or genius, in order to learn those conditions and characteristics that lead to success in life.

#### OBJECTIONS TO PSYCHO-PHYSICAL METHODS.

Objections are frequently made to the present psycho-physical methods of studying man. It is said that too much importance is attached to the physical side of man, as though the soul and mind could be measured by an instrument of precision. It is not intended here to enter upon a special discussion of this subject, about which there may be difference of opinion. The measurements made are measurements of the

body or of physical effects in the body arising from either physical or mental causes or from both causes.

When, for instance, an instrument to measure pain, as a temporal algometer, is pressed against the temple with gradually increasing force, and the subject tells as soon as the increasing pressure becomes in the least disagreeable—we will say that when the pressure reaches 2,000 grams it begins to feel disagreeable—the question arises as to what does this 2,000 grams pressure measure. It is not true to say that this is wholly a physical measurement, much less to say that it is wholly a mental or emotional measurement. It seems to be simply an approximate measurement of the combination of these three elements. In the present state of knowledge it would be hazardous to say which element enters most into the measurement.

The impression is sometimes formed from reading descriptions of instruments and details of long series of experiments, that psycho-physical study ignores introspection; but this is a misconception.

It is natural that most investigation in comparatively new lines should take up the more elementary phenomena. Introspectional states of consciousness are perhaps the most complex, and it would have been premature to enter into their consideration before the simpler states had been thoroughly studied. There should be extensive investigation of introspection; it should be considered experimentally under definite conditions, etc. Speaking of the common error which makes experimental psychology a mere study of sensation and reaction time, Münsterberg says:—"Association and attention, memory and judgment, space and time, feelings and will, etc., these are the problems of study where the future of experimental psychology lies.

#### TRUTH FOR ITS OWN SAKE.

Notwithstanding the practical utility of anthropometry, which we have stated above, objection is sometimes made that it, as well as other phases of scientific investigation, cannot always be of immediate use.

The question is often asked as to the utility of experiments of this nature. The commercial or utilitarian spirit does not yield the best results, though it sometimes brings quick and paying returns. But in all experimental work much is done that subsequently is seen to have been unnecessary. This is mainly because the real significance of any initial truth cannot be known until the discovery of other truths has been made. The purely practical point of view sometimes assumes that we ought to know beforehand what an experiment is going to prove, as though the investigation were but an interesting pastime, for, of course, there would then be no necessity for the experiment.

In an empirical investigation new lines of study require much more detail. As a rule, it is better to have too many data than too few; for to assume in a preliminary inquiry what material is important and what not important is premature. To exclude material on theoretical grounds at the outset is to allow pre-suppositions undue influence. A laboratory inquiry may be continued a year or more, and often the result of all the labour may be stated in one page or one sentence; or there may be only a negative conclusion, but this is no reason that an investigation should not be undertaken. Negative results may be useful for future study in indicating what methods or material to avoid.

Certain objections are sometimes made to new and necessarily incomplete lines of work. The type of objections referred to would hardly be made by investigators. Thus, it is sometimes said that unrelated facts, like a pile of bricks, do not make a house; but the answer is, you cannot build a house or form a science without these separate facts; they are the material itself. It may be asked what is the use of knowing, for instance, that one group of children are more sensitive to heat than another group. We think there is some use, but we will waive that. The point of view suggested by these and similar objections overlooks the fact that such objections would have applied to all sciences in their early stages. If, for instance, individual facts about children, even if their immediate

use is unknown, are not important, what is important in life? Many such objections would involve a discussion of points of view of life which it would be out of place to consider now. But it may be said, in general, that the primary object of science has always been *truth for its own sake*, and under the inspiration of this ideal many discoveries of the greatest utility to humanity have been made.

#### METHODS OF STUDY.

To establish the measure of work according to the strength of the individual is fundamental to the economy of health. This is especially true of children, but the difficulties here are greater than in adults, owing to the changes caused by growth. Overtaxing of the powers here leaves its mark generally throughout the whole future life of the child. No question, then, can be more important for the school, according to Combe, than—

(a) What is the maximum work suitable to a child in the different periods of development of its school life?

(b) Can this maximum be injurious at certain times, when all the vital force may be required for growth?

We must first know the physiology of normal growth, whether it is regular and when it increases or decreases in rate, and what influences this increase and decrease. There are two methods of pursuing such an investigation—the collective method and the individual method.

The collective method consists in measuring large numbers of children of every age, and obtaining the average or mean for each age, the value of which is in proportion to the number measured. Quetelet, of Brussels, was one of the first to use this method, but he only measured ten of each sex, which is too small a number to give any certainty to the results. Of much more importance are, for instance, Dr. Bowditch's measurements of 24,000 Boston school children. This method was employed by Alex. Hertel in Denmark, who measured 28,384 children in the different public schools. Axel Key in Sweden measured 15,000, most of whom were in the high schools;

Erismann gives results from 3,000 children in Moscow, Pagliani for 2,016 in Turin. Kotelmann in Hamburg made very careful and extensive measurements, but on a limited number.

The individual method was employed by Lihartzik in Vienna, who investigated 200 from 8 to 14 years of age, measuring them each year.

The results of both methods are not always exact. Most authors have, for example, considered children as being 9 years of age who were anywhere between the ages of 9 and 10. Others have more correctly recorded them at their *nearest age*. The result is that the averages of different authors are not for exactly the same years of age. Louis Roux, of Switzerland, employed a new and much more exact method, which consisted in following the month of birth, instead of the year, so that there were twelve groups. Thus, it was found that children born in summer were larger than those born in winter, a fact that may prove to be of some significance.

#### WHAT IS A NORMALLY DEVELOPED CHILD?

This question might be answered, but only within certain limits, owing to the variation and complexity of the human species. A method of inquiry would be to seek out the positively abnormal children and find what characteristics are peculiar to them. The remaining children in a general way might be called normal.

At present the desire is to find the norm, the average, the type or types of the great mass of children. This can be done only by measurements on large numbers, these measurements to be summarised according to the statistical method.

It is a common saying that "almost anything" can be proved by statistics. This may be true with their wrong interpretation. Yet without statistics there is little or no basis for opinion or conclusion. Every additional observation through counting, measuring, or weighing, every repetition of an experiment, when applied to large numbers, lessens the amount of error, giving a closer approximation to truth, against which preconceived ideas or theories have little weight.

According to Hasse, one of the aims of anthropometry is to find the normal relation between mental and physical development. The close relation of anthropometrical measurements of school children to hygiene will be evident when it is asked within what general limits shall growth in height, weight, strength, etc., be considered as representing a healthy normal child. In our present state of knowledge it would be hazardous to define a normally developed child.

#### ANTHROPOMETRY AND ABNORMALITIES.

There is doubtless in the early periods of life, up to adult age, a certain relation of bodily organs to one another. A want of such a relation may produce abnormalities, which in turn may give a lack of grace, symmetry, or beauty to the human body. If such a relation is to be generally established, so that we may know within certain limits what can be considered the proper bodily proportions, measurements of large numbers of children at different ages and stages of growth must be made. Hence the only way to a definite knowledge as to the development of the human body will be through long and painstaking investigations. Thus the causes of homeliness, lack of beauty, deformities, and the like may be more definitely ascertained. This in turn may help in their prevention. Such abnormalities affect not only beauty, but, what is more important, health. When abnormalities are discovered early in youth there is more opportunity of avoiding their evil effects. The relation of these body abnormalities to disease may prove of practical importance. Thus Hildebrand, an experienced investigator, remarks that delicate slender people are much more subject to typhoid fever than to consumption; another says of the same class that they are much more inclined to nervous troubles than other people. Another physician of large experience asserts that where chest and trunk remain undeveloped the head and extremities are much more developed.

Beneke in Marburg has shown that the relation between the size of the heart and the circumference of the arteries is

gradually changed during the growth of the body, and that there is a consequent variation in blood pressure. This is specially true at puberty, when the heart increases very fast in volume; for the arteries increase much in length with the increase of length of body, but their diameter is relatively little increased, so that much more work is required of the heart. Thus the growth in the length of body can be of the greatest importance to the development of the heart. Should this growth be irregular or abnormally fast, serious difficulties may arise, and Beneke has endeavoured to show that herein lies the cause of the development of consumption at puberty. The importance, therefore, of determining the normal rate of growth is evident.

CONCLUSIONS AS TO WASHINGTON SCHOOL CHILDREN.

For the convenience of those who may not go further into this inquiry, we give below the conclusions from our investigations of the Washington school children:—

CONCLUSIONS AS TO 1,074 CHILDREN SPECIALLY STUDIED.

1. Dolichocephaly, or long-headedness, increases in children as ability decreases. A high percentage of dolichocephaly seems to be a concomitant of mental dulness.
2. Children are more sensitive to locality and heat on the skin before puberty than after.
3. Boys are less sensitive to locality and more sensitive to heat than girls.
4. Children of the non-labouring classes are more sensitive to locality and heat than children of the labouring classes.
5. Coloured children are much more sensitive to heat than white children. This probably means that their power of discrimination is much better, and not that they suffer more from heat.

CONCLUSIONS AS TO ALL THE SCHOOL CHILDREN.

6. As circumference of head increases mental ability increases.\*

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\* It being understood that the race is the same.



7. Children of the non-labouring classes have a larger circumference of head than children of the labouring classes.

8. The head circumference of boys is larger than that of girls, but in coloured children the girls slightly excel the boys in circumference of head.

9. Coloured girls have larger circumference of head at all ages than white girls.

10. An important fact already discovered by others is that for a certain period of time before and after puberty girls are taller and heavier than boys, but at no other time.

11. White children not only have a greater standing height than coloured children, but their sitting height is still greater; yet coloured children have a greater weight than white children—that is, white children, relatively to their height, are longer bodied than coloured children.

12. Bright boys are in general taller and heavier than dull boys. This confirms the results of Porter.

13. While the bright coloured boys excel the dull coloured boys in height, the dull excel the bright in sitting height. This seems to indicate a relation or concomitancy of dulness and long-bodiedness for coloured boys.

14. The pubertal period of superiority of girls in height, sitting height, and weight is nearly a year longer in the labouring classes than in the non-labouring classes.

15. Children of the non-labouring classes have, in general, greater height, sitting height, and weight than children of the labouring classes. This confirms the results of investigations by Roberts, Baxter, and Bowditch.

16. Girls are superior to boys in their studies (but see conclusion 19).

17. Children of the non-labouring classes show greater ability in their studies than children of the labouring classes. This confirms the results of others.

18. Mixture of nationalities seems to be unfavourable to the development of mental ability.

19. Girls show higher percentages of average ability in their

studies than boys, and therefore less variability. This is interpreted by some to be a defect from an evolutionary point of view (but see conclusion 16).

20. As age increases brightness decreases in most studies, but dulness increases except in drawing, manual labour, and penmanship; that is, in the more mechanical studies.

21. In coloured children brightness increases with age, the reverse of what is true in white children.

#### CONCLUSIONS AS TO CHILDREN WITH ABNORMALITIES.

22. Boys of the non-labouring classes show a much higher percentage of sickliness than boys of the labouring classes.

23. Defects of speech are much more frequent in boys than in girls.

24. Boys show a much greater percentage of unruliness and laziness than girls.

25. The dull boys have the highest per cent. of unruliness.

26. Abnormalities in children are most frequent at dentition and puberty.

27. Children with abnormalities are inferior in height, sitting height, weight, and circumference of head to children in general.

#### INFLUENCE OF SEX ON ABILITY.

Comparing in general the boys and girls of American parentage, as summed up under "totals," the boys are inferior to the girls in eight studies, superior in two, and equal in four.

If, now, we compare the boys of American parentage, non-labouring class, with the girls of American parentage, non-labouring class, eliminating as far as possible the influence of sociological conditions, we find that the girls excel the boys still more, being equal to them in arithmetic, where they were inferior, and superior to the boys in geography, where they were formerly equal to them.

Comparing boys and girls of the labouring classes, American parentage, the boys gain some; they are superior in "all

studies" and history, where they were equal to the girls; they are equal in drawing, where they are inferior to the girls.

Comparing boys and girls of mixed nationalities, the boys become superior in algebra, where they are inferior. Thus, whatever sociological or racial division is made, the girls always excel in most of the branches of study.

#### INFLUENCE OF SOCIOLOGICAL CONDITIONS ON ABILITY.

If we compare boys of American parents, non-labouring class, with boys of American parents, labouring class, the influence of sociological conditions will be found to be quite marked; thus the boys of American parentage, non-labouring class, are equal to the boys of American parentage, labouring class, in five studies, superior in nine, and inferior in none. Sociological conditions affect the girls still more, as indicated, where the girls of American parentage, non-labouring class, excel the girls of American parentage, labouring class, in all branches.

#### PROBABLE INFLUENCE OF FOREIGN AND MIXED NATIONALITIES ON ABILITY.

The probable influence of foreign and mixed nationalities on ability is seen by comparing boys and girls of foreign and mixed nationalities with boys and girls of American parentage. The boys of foreign and mixed nationalities are superior to the boys of American parentage in one study, equal in eight, and inferior in five; the girls of foreign mixed nationalities are inferior to the girls of American parentage in nine studies, superior in none, and equal in five. The influence of foreign and mixed nationalities seems unfavourable to the development of ability.

#### PUPILS OF AVERAGE ABILITY CONSIDERED AS TO SEX, SOCIOLOGICAL CONDITION, AND NATIVITY.

While the girls excel the boys in ability in most branches, they at the same time show higher percentages of average ability, and therefore less variability. Thus, in "totals," we find the boys to be inferior in average ability to the girls in nine studies, superior in four studies, and equal in one study.

From this special point of view boys might be considered superior to the girls, for, from an evolutionary point of view, the superior species varies the most, and therefore may adapt itself better to circumstances.

Comparing boys of the non-labouring class with boys of the labouring class, the former are inferior to the latter in average ability in eleven studies, superior in one, and equal in two. The girls of the non-labouring class are inferior in average ability to the girls of the labouring class in ten studies, superior in two, and equal in one study.

Girls of the non-labouring class compared with girls of the labouring class are inferior in average ability in ten branches, superior in two, and equal in one.

We find boys of foreign and mixed nationalities to be inferior in average ability in one study, superior in eleven studies, and equal in two to boys of American parentage.

Girls of foreign and mixed nationalities are inferior in average ability in four studies, superior in eight, and equal in two to girls of American parentage.

In general, therefore, unfavourable sociological conditions and foreign and mixed nationality seem to produce an increase of, or are concomitants of, average ability.

#### ABILITY IN RELATION TO AGE.

In both boys and girls, as age increases, the percentage of brightness decreases in all the studies, except drawing, manual labour, and penmanship; that is, in the more mechanical studies. This would suggest that ability in mechanical studies depends more upon the practice and time given to them than is true of less mechanical branches.

As age increases the percentage of dulness increases in all the studies except in drawing, manual labour, penmanship, music, and science.

As age increases, the percentage of average ability increases in different studies in general, except in spelling.

The boys differ from the girls mainly in the relation of average

ability to age. As age increases in the boys, average ability increases in all studies except in arithmetic, algebra, manual labour, and penmanship, while in girls average ability increases in all studies except in drawing, geography, history, penmanship, science, and spelling. Thus average ability in girls increases with age in more studies than in the case of boys.

#### COLOURED CHILDREN.

Coloured girls are superior to coloured boys in six branches, inferior in two, and equal in three.

In average ability the boys show a higher per cent. in all studies except science, indicating less variability than the girls, which is the reverse of the case in white children.

#### ABILITY AND AGE IN COLOURED CHILDREN.

The relation of age to ability in coloured children is quite variable, but it may be said that the coloured children generally increase in brightness as age increases, whereas the white children decrease in brightness as age increases. It would seem that the cause of this difference in the coloured children is racial.

As age increases in girls, the percentage of average ability increases, except in drawing, geography, history, science, and spelling.

#### CONCLUSIONS.

1, In general, the sensibility to pain decreases as age increases. The left temple is more sensitive than the right. This accords with former experiments (see below), that the left hand is more sensitive to pain than the right hand. There is an increase of obtuseness to pain from ages 10 to 11; then a decrease from 11 to 12; then an increase from 12 to 13. From 13 to 17, while the right temple increases in obtuseness, the left temple increases in acuteness. This is in the post-pubertal period. There is a general variation, which experiments on larger numbers might modify.

2. Girls in private schools, who are generally of wealthy

parents, are much more sensitive to pain than girls in the public schools. It would appear that refinements and luxuries tend to increase sensitiveness to pain. The hardihood which the great majority must experience seems advantageous. This also accords with our previous measurements (see below), that the non-labouring classes are more sensitive to pain than the labouring classes.\*

3. University women are more sensitive than washerwomen, but less sensitive than business women. There seems to be no necessary relation between intellectual development and pain sensitiveness. Obtuseness to pain seems to be due more to hardihood in early life.

4. Self-educated women, who are not trained in universities, are more sensitive than business women. Giving, then, the divisions in the order of their acuteness to the sense of pain, they would stand as follows :—(1) Girls of the wealthy classes ; (2) self-educated women ; (3) business women ; (4) university women ; (5) washerwomen. The greater sensitiveness of self-educated women as compared with university women may be due to the overtaxing of the nervous system of the former in their unequal struggle after knowledge.

5. The girls in the public schools are more sensitive at all ages than the boys. This agrees with the results of our previous measurements, that women are more sensitive to pain than men.

These measurements of least disagreeableness, or of threshold of pain, are approximate measurements of the combination of nerve, feeling, and idea.

RESULTS OF PREVIOUS EXPERIMENTS † (1,412 PERSONS).

Women are more sensitive to pain than men.

American professional men are more sensitive to pain than American business men, and also more sensitive than both

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\* By "labouring classes" are meant artisans and unskilled labourers. "Non-labouring classes" refer to professional and mercantile men.

† In previous experiments the author employed Cattell's hand algometer. *Psychological Review*, March, 1895 and 1896.

English and German professional men. The labouring classes are much less sensitive to pain than the non-labouring classes.

The women of the poorer classes are much less sensitive to pain than those in more comfortable conditions.

Young men of the wealthy classes are much more sensitive to pain than men of the working classes.

Young women of the wealthy classes are much more sensitive to pain than young men of the wealthy classes. As to pain, it is true in general that women are more sensitive than men, but it does not necessarily follow that women cannot endure more pain than men.

The left hand is more sensitive to pain than the right hand.

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## REPORTS OF CASES.

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### A CASE OF SECONDARY SARCOMA OF THE LUNGS.—DOUBLE PNEUMOTHORAX.

BY F. R. GREENWOOD, M.B.

ON July 12th, 1899, C. H. K., aet. 10, was admitted to the Children's Hospital suffering from marked dyspnoea. The dyspnoea had been present for about thirty-six hours, but on admission he appeared to have just had a more severe paroxysm in the cab which brought him, and was becoming a little easier again.

*Past History.*—Patient has never suffered from any of the specific fevers, having always enjoyed good health until about eighteen months ago, when he developed a tumour below the left knee in connection with bone. The tumour proved to be a rapidly increasing sarcoma, and consequently the left leg was amputated above the knee (at the General Hospital in January, 1898). After the operation, the patient appeared to get on quite well, but the mother noticed that soon afterwards lumps formed in each groin and also one on the right side of his neck.

Four months ago, previous to admission, however, he began to lose weight and since then has continued to do so very rapidly. Also, about the same time, the patient developed a slight hacking cough with shortness of breath. He was put under medical treatment but gradually got worse. The cough did not trouble him much by day, but was very irritating during the night. At no time was there hæmoptysis.

*Present Illness.*—The present acute symptoms began the day before admission (July 11th). The patient was having tea, and immediately after a drink he exclaimed "O mother, my breath is going." The mother noticed that the patient looked very ill, and put him to bed immediately, but he was unable to lie down, owing to the dyspnœa. Getting gradually worse, the next day he was admitted to the hospital. There had been no vomiting and no complaint of pain.

There are three other children in the family all quite healthy, and not presenting any history of phthisis, nor is there anything to suggest that any of the nearer relatives have suffered from any form of malignant disease.

*Present Condition.*—On admission the patient was bathed in a cold sweat, having just had a severe paroxysm of dyspnœa. He was extremely emaciated. There was marked orthopnœa, and the fact that the child was *in extremis* made thorough physical examination out of the question.

*Respiratory System.*—The chest is somewhat barrel-shaped. The respirations are extremely shallow and carried on entirely by the upper costal muscles, and being accompanied by great retraction in the lower-epigastrium. The patient sits in bed in a characteristic position, finding the greatest ease in sitting up with his arms and shoulders raised to their utmost and so helping his extraordinary muscles of respiration in their action.

Respirations number 44. There is no cough and the patient complains of no actual pain. On percussion the chest is hyper-resonant throughout. At the base the resonance is sharply limited, and the liver dulness not perceptible. The cardiac dulness is obliterated entirely, and apex beat cannot be made



out. Anteriorly the upper border of the liver cannot be detected by percussion within the thorax.

On auscultation the breath sounds over the whole of the chest are weak and distant, and it is evident that very little air enters the alveoli. Expiration is more prolonged and more forcible than inspiration. (No laryngeal obstruction present.) The sounds were quite dry and entirely free from any accompaniments. No expectoration. On auscultation over cardiac area the heart sounds are pure but distant. Pulse was small with tendency to increased tension, becoming "wiry" just before death. Pulse-rate, 136 per minute.

As the patient's condition was gradually getting worse it was deemed advisable not to interfere with him any more that evening. Later in the evening the patient became suddenly worse, with cyanosis about the lips, and covered with a cold sweat. This lasted for a few minutes, when he died.

*Post mortem* examination was made the following day, the notes of which are as follows:—Rigor mortis and *post mortem* lividity well marked. Body is considerably emaciated. The stump of the left leg appears healthy; no sign of any recurrence of the original growth. Enlarged glands can be felt in Scarpa's areas. There is a gland, about the size of an almond, on the right side of the neck. Shotty glands to be felt in the axillæ and over the pectorals. On percussing the chest there is hyper-resonance all over, obliterating the cardiac area and making percussion of the heart impossible. The resonance is slightly more marked on the right than on the left.

*Abdomen*.—Liver is displaced entirely from under the ribs. The diaphragm is depressed on both sides.

*Liver*.—Weight 22 ounces. Shows venous congestion, otherwise healthy.

*Spleen*.—Weight 1½ ounces. Congested.

*Kidneys*.—Weight (together) 3 ounces. Capsule strips readily. Organs dark from venous congestion. Glands in the folds of the mesentery are slightly enlarged, but no very large ones.

*Thorax*.—On cutting through the costal cartilage the air

rushed out under considerable pressure, and the liver was seen to rise immediately into its position on the corresponding side. The opposite side in a similar way showed the presence of air in the pleura, and on relieving the tension the liver on that side passed up into its usual position. Both pleuræ were thus filled with air and the lungs were consequently in a corresponding state of collapse. There was no fluid in the chest. The right side was quite free from any adhesions, but on the left side a few adhesions were present at the posterior part of the lung in the form of bands.

The *Lungs* consist of a mass of multiple growths leaving very little lung tissue. They appear on the surface in the form of bosses. Being pale yellow in colour they stand out in great contrast to the lung proper which shows much injection of vessels. The size of the growths varies from that of a filbert to a hen's egg, some even being larger. They are soft, and their consistence and appearance may be compared to "brain-matter." Two or three nodules were situated in the upper border of the diaphragm, and scattered nodules could be seen on the spine and inner side of chest wall.

*Heart* was normal, but a few nodules were found on the pleural surface of the pericardium. Microscopic examination of the growth showed it to be sarcomatous, the cells being round and large.

The case is interesting from three points. Firstly, the case was a beautiful example of secondary infiltration of the lung with malignant disease. Opportunities of seeing these cases verified *post mortem* are not as common as one would expect, the majority of such patients usually ending their days out of hospital. Secondly, the case is interesting as affording an instance of double pneumothorax; and thirdly, the comparative rarity of a pneumothorax following on malignant disease of the lung.

The way the two sides of the liver returned to their respective positions on releasing the corresponding tension within the pleura is very interesting as showing that the kind of displacement of

the organ will depend upon which side of the chest is distended, and it is not the organ as a whole that is depressed.

In conclusion, I must thank Dr. Richards for allowing me to make use of these notes.

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### CASE OF ACUTE RHEUMATISM, CHOREA AND CANCRUM ORIS SUPERVENING—DEATH.

BY W. H. COLTART, M.R.C.S., L.R.C.P.

A. N., æt. 12, was admitted on Jan. 24, 1899, to the Queen's hospital under the care of Dr. Foxwell, by whose kind permission the case is published. He came under observation three years after the commencement of his ill-health, which appears to have been a slight attack of acute rheumatism, and a few months later he had a relapse with cardiac symptoms, and was detained in the Children's hospital for seven weeks. During his stay there he developed a slight attack of chorea.

On admission, the symptoms complained of were those of right heart failure including dyspnœa, cyanosis, general dropsy, and pain in the upper part of abdomen, but there were then no signs of articular rheumatism beyond the presence of nodules around the elbow joints and a slight evening rise of temperature.

The circulatory system had evidently broken down to a considerable degree. Pulse 120, small, irregular, A.B. weak, diffused, reaching to the anterior axillary line in 5th space; there was systolic recession in 4th space and percussion showed both sides of heart to be considerably dilated. Mitral and tricuspid regurgitant murmurs were heard with a faint first sound, and the case was diagnosed as one of mitral and tricuspid regurgitation with probable old pericarditis. In addition, there were present bronchitis, enlarged liver with slight ascites and albuminuria.

He reacted well at first to infusion of digitalis, and the pulse rate came down as low as 48 with great amelioration of general symptoms. He was discharged after a stay of seven weeks.

Three weeks later he again presented himself with the same symptoms of cardiac break-down, and again he reacted well to cardiac tonics, and all went well for a month. On June 19th he complained of pain in the knees and shoulders, the temperature rising the night before to 99.6°, and there was noted some fulness in the infra-patellar pouches. From this time onwards he steadily lost ground, the poison attacking in turn the joints, tendon-sheaths and serous membranes of the chest, and probably myo-cardium itself.

On June 29th he first developed definite choreiform movements of both hands and both sides of the face, and he wore the significant expression of a child with St. Vitus' Dance; that diagnosis was arrived at in the absence of any other sign of cerebral embolism. Three days later the chorea had diminished in intensity, but the general condition became increasingly grave, and the prognosis was rendered quite hopeless on July 2nd by the advent of double cancrum oris.

He died during the night of July 5th from exhaustion.

The *Autopsy* by Dr. Stanley, July 6th, showed every organ to be diseased, and the patient might be fitly described as a rheumatic wreck. Shortly, there was intense chronic venous congestion, with consequent changes of all tissues. The effects of rheumatism and chorea were well represented, viz., adherent pericardium, pleuro-pericardial adhesion, scattered perisplenitis and peri-hepatitis. The endocardium showed the extent and intensity of the inflammation to a marked degree. Every cusp of every valve, with the exception of those of the pulmonary valve, was studded with vegetations of varying age and thickness, those on the mitral curtain being apparently of greatest age. In the centre of each aortic cusp a small, perfect cauliflower-like excrescence was found, occupying exactly the position of the corpus Arantii.

A broth tube was inoculated from both the Rolandic and inferior frontal sulci of the left brain. No result came of that from the Rolandic area, but an agar-agar cultivation of that from the frontal sulcus gave a pure culture of a micro organism, the

identification of which is at present being determined. The value of the observation is lessened by the fact that the child had cancrum oris and possibly septicæmia; still, in that case both tubes should have given positive results. At present no sound inference can be drawn from the observation, but it is mentioned as an interesting fact.

An apology for recording this case is perhaps scarcely necessary at a time when the relationship of the ætiologies of chorea and rheumatism comes under discussion with so much attention at the learned societies of the medical world.

P.S.—The results of the identification, kindly undertaken by Mr. Leedham-Green, have come to hand since receiving the proofs. The cultivation is one of *staphylococcus pyogenes albus*. No putrefactive micro-organisms being present.

### A CASE OF INVERSION OF THE UTERUS.

BY JOHN W TAYLOR, F.R.C.S. ENG.

SURGEON TO THE

BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN.

IN the English edition of Dührssen's Manual of Gynæcological Practice, under the heading of Inversion of the Uterus, the following note was inserted by myself and Dr. Edge.

"For the treatment of this condition, *elastic pressure*, applied to the inverted fundus by means of the repositors of Aveling or Tait, is so very satisfactory that it may be said to have replaced all other methods in this country. It very rarely fails, even when "taxis" under deep anæsthesia has been unsuccessful, and its employment in the first place, as a matter of course, is strongly to be recommended"

The following case treated in my ward at Sparkhill, affords a good illustration of this practice, and tends to confirm the value of the advice given in the paragraph I have just quoted.

Mrs. M. A. C., aged 20, primipara, was confined on August 9th, 1895. Up to (and including) the delivery of the child, the labour was a normal one and the child is living and healthy.

No instruments were used. Difficulty occurred in the removal of the placenta. The latter was retained, and when finally expelled the fundus of the uterus came with it and the whole organ was found to be completely inverted. At this stage there was considerable loss of blood and consequent collapse, and no attempt was made to replace the inverted uterus, but the general symptoms were alone attended to.

When the patient rallied from this condition, the inversion continued and became chronic. Pain was complained of across the lower part of the abdomen, the latter was tender on pressure and there was for some ten days absolute retention of urine for which the catheter was used both night and morning. The patient was very feeble and unable to suckle her baby, but gradually gained strength. The retention of urine became an occasional symptom only, and although considerable abdominal tenderness remained and there was a certain amount of pyrexia ( $99^{\circ}$ — $101^{\circ}$ ) the patient's general condition slowly improved.

I saw the patient in consultation with her doctor on Wednesday, August 21st (12 days after delivery), confirmed the diagnosis of inversion and ordered her removal into hospital. On August 23rd she was admitted to my wards at the Women's Hospital, Sparkhill, her temperature on the evening of admission being  $100.4^{\circ}$ . On the 24th I made an examination and found a large globular or pear-shaped mass, with irregular surface easily bleeding, presenting and almost protruding at the vulva. After separating the labia the tumour was plainly visible on inspection, and looked exactly like a large fibroid polypus. The upper limit of the tumour could scarcely be reached by the tip of the examining finger. On bi-manual examination no fundus could be felt by the hand palpating the abdominal parietes, and on examination by the rectum the mass in the vagina was felt to abruptly terminate at the top of the vagina. This was evident, but the mass in the vagina was too big, and therefore the inversion-ring at too high a point from the perinæum to admit of the introduction of a finger-tip into the cup of the inversion.

These signs, together with the undoubted history of recent

delivery, made the diagnosis of inversion of the uterus sufficiently clear to warrant treatment directed to the replacement of the organ. After the thorough disinfection of the vagina with lysol solution, I applied the largest size of Tait's repositors to the inverted uterus. The cup of the repositor was applied to the lowest (presenting) part of the inverted fundus and the elastic attached to the stem so adjusted as to keep the latter in the same direction as the inversion. Very little force was used, the elastic being only tightened sufficient to keep the instrument well applied. At the time of application the temperature was  $99^{\circ} 8'$ . 7 p.m., no reposition. Repositor re-adjusted more tightly, temperature  $100^{\circ}$ .

25th. 10.30 a.m. The patient had slept fairly well and was free from pain. No reposition. The vagina was thoroughly cleansed and the repositor re-adjusted still more tightly. Temperature  $100^{\circ}$ . Evening temperature  $101^{\circ}$ .

26th. 9 a.m. The patient continued free from pain. On examination the uterus was found to be completely replaced; the cup of the repositor being within the reconstituted uterine cavity and the cervix somewhat contracted around the stem. The repositor was removed with some difficulty, the uterus and vagina cleaned out with 1 per cent. lysol solution, and a strip of iodoform gauze was left within the uterus. On enquiry the patient could not tell when the reduction was effected. Temperature  $101^{\circ} 2'$ .

The temperature of the patient which had been somewhat raised during the whole of the time that she had been under my observation was not immediately affected favourably by the reduction of the inversion. The record from this date to complete convalescence is as follows:—

26th. Evening,  $102^{\circ} 2'$ . 27th. Morning,  $100^{\circ} 4'$ ; evening  $103^{\circ} 6'$ .  
 28th. Morning,  $101^{\circ}$ ; evening,  $102^{\circ}$ . 29th. Morning,  $100^{\circ}$ ; evening,  $100^{\circ} 2'$ . 30th. Morning,  $100^{\circ}$ ; evening,  $99^{\circ}$ . 31st. Morning,  $99^{\circ}$ ; evening,  $99^{\circ} 4'$ . September 1st. Morning,  $99^{\circ}$ ; evening,  $98^{\circ} 2'$ .

In spite of the gauze drain inserted after reduction there was

in all probability less perfect drainage after the organ was replaced than while it was inverted. At no time was there any evidence of inflammation outside the uterus. With the exception of the temporary pyrexia, the patient made a good and uneventful recovery. From first to last the absence of pain was remarkable, and the treatment of the condition, although somewhat troublesome and tedious, required the administration of neither anæsthetic nor anodyne.

Inversion of the uterus is a rare accident and every case which has existed for several days or weeks is of considerable interest, for a chronic inversion is never very readily or easily replaced.

The problem of treatment was for many years a difficult one. A case left alone suffers from considerable discomfort and disability, but life is rarely if ever lost directly from the displacement. On the other hand, several cases are known in which a fatal result has apparently been directly induced by the means undertaken for the reduction of the inversion. I have myself seen one case of this kind in which after futile attempts at manual reposition under anæsthesia, the uterus was amputated by the *écraseur*.

The treatment I have been advocating involves little or no danger to the patient when skilfully used, and is almost always attended with success. No time, therefore, should be lost or risk of injury incurred by the use of other methods which are usually futile and occasionally disastrous.

It is now nearly sixty years since Mme. Boivin and Prof. Dugés (in their remarkable book, "*Maladies de l'Uterus et de ses Annexes*,") advised the gradual reduction of inversion of the uterus by "gentle and continuous pressure." They wrote as follows:—"Could not one exercise continuous pressure from below upwards by tamponading the vagina or by keeping a pessary with a stem and large cup (like the cup and ball pessary) applied to the inverted fundus?" (p. 238).

It is precisely this suggestion which is carried out by the use



of Tait's repositors, and there is no method of treatment more generally applicable or more generally successful.

From a somewhat extended experience of this displacement it appears to me that three methods of treatment are worthy of recognition.

The first is manual reduction. This is only applicable to the period immediately following displacement. The fingers of the accoucheur (carefully cleaned and sterilized) grasp the inverted fundus and aim at reposition by pushing back or returning *not* the inverted fundus but the inverted wall of the uterus which has last come down. If this be started back the fundus returns easily.

This method should be always used at the time of confinement, when inversion follows the removal of the placenta. It is then peculiarly suitable and efficacious, but the time when it may be used with safety is strictly limited to the period immediately following displacement.

The second method, that of reposition by elastic pressure (of which the present case is an example) is suited for the greater bulk of cases which are seen at some period shortly removed from the confinement when the displacement is becoming chronic, but the inverted uterus is still large and soft and congested.

The third method, that of operation by the methods of Küstner or Dührssen, is suited for still more chronic cases in which elastic pressure has been tried unsuccessfully, and in which (in spite of the inversion) involution of the uterus is sufficiently advanced to admit of operative work on the cervix and cup of the inversion ring. A very good example of the successful use of this method was recorded in the *Birmingham Medical Review*, January, 1897, by my colleague Mr. Jordan.

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## ON HYPER-PYREXIAL PNEUMONIA.

BY W. DUNCAN LAWRIE, M.B., C.M. EDIN.,  
RESIDENT SURGEON, BIRMINGHAM GENERAL DISPENSARY.

THE following three cases occurred during an epidemic of pneumonia in Nottinghamshire during the summer of 1896.

The epidemic was characterised by the ordinary features of lobar pneumonia, and the crisis occurred usually on the 7th day. Although adults were not exempt, the majority of cases occurred amongst children and infants. The mortality was low. Out of from 40 to 50 cases, only two deaths occurred. Empyema only followed in two cases which came under my notice.

Case 1. H. B., aged 3 years.—On 14th May, 1896, the child became suddenly ill, and I found her in a condition of collapse, comatose, cyanosed, with feeble rapid pulse and extremely hurried respiration. The physical signs of commencing pneumonia were present over the right upper lobe. Temperature was  $103^{\circ}$ . The collapse was met by a hot mustard bath with cold affusion to the chest, and a hypodermic injection of ether.

May 15th. The child was less collapsed. Temperature  $104^{\circ}$ . 16th, delirious. 17th, still delirious. At 7 p.m. the child became comatose. Temperature was  $106^{\circ}$ . Cold sponging and affusion with iced water was kept up for an hour with little effect on the temperature, and about 9 o'clock the child was placed in a cold bath for about twenty minutes, when the temperature fell to  $103^{\circ}$ . The child was now enveloped in a wet sheet and exposed to a current of air for an hour, and the comatose condition passed off. She was then dried, covered by a single sheet, and lay thus without further covering freely exposed to a current of air throughout the night.

May 18th. In spite of the slight covering allowed and the free entrance of fresh air, at 12 o'clock a.m. the temperature was  $105^{\circ}$ , and the child was becoming comatose. At 4.30 p.m. the temperature was  $106^{\circ}$ , and the patient comatose. The skin surface was rubbed with ice, and as this had very little effect on the temperature as taken per rectum, the patient was placed in

the cold bath to which ice was freely added, and the temperature was in half-an-hour reduced to normal. The child was then shivering and blue, but her condition was much improved. Brandy was given, and a blanket allowed for half-an-hour. At 9 o'clock p.m. the temperature had risen to  $105^{\circ}$  and cold sponging was commenced and continued from this time until the crisis at frequent intervals and for periods varying from 5 to 30 minutes as temperature required.

May 19th. In spite of frequent cold sponging, temperature rose by 5 o'clock p.m. to  $106^{\circ}$ , and the patient again became comatose. A cold bath was again employed, and in half-an-hour the temperature fell to  $100^{\circ}$ , and the bath was discontinued. No symptom of collapse was observed on this occasion. Cold sponging had to be recommenced in two or three hours.

May 20th. Temperature  $105^{\circ}$ . Cold sponging continued. May 21st, temperature  $100^{\circ}$ .

The convalescence was retarded by middle ear suppuration on both sides and by an abscess at the seat of hypodermic puncture, but by 6th June the convalescence was complete.

This case is interesting in the persistent tendency to hyperpyrexial coma. It proves how useless it is to trust to any measure less than immersion in cold water in a severe case of hyperpyrexia, and shows how much can be done without a hospital staff at one's elbow, for I only had the help of an earnest but quite untrained woman. The fear of a pneumonia patient "catching cold" would appear to be groundless, as free ventilation was observed, and the child lay exposed for three days covered solely by a sheet. Cold baths were used three times, and during the three days of hyperpyrexia the patient was sponged for probably no less than eight hours. It was observed that immersion in cold water (the temperature of which was kept low by frequent fresh additions and by ice) for thirty minutes was necessary to reduce the temperature of the patient from  $106^{\circ}$  to  $100^{\circ}$ , and that the first degree of temperature was only lost after ten minutes' immersion.

Case 2. A boy, aged 5 years.—26th May. The illness

began suddenly at two o'clock, and the patient soon became delirious. At 10 p.m. he was delirious and unconscious; temperature was  $106.5^{\circ}$ . There was dulness with fine pneumonic crepitations at one base, diarrhoea of a foetid character, and an inflammatory swelling on the dorsum of one foot. He was placed in a cold bath for half an hour, when the temperature fell to  $100^{\circ}$ , the patient became sensible and inclined to sleep, and the general condition was much improved.

May 27th. At 4 a.m. I was called and found the temperature  $105^{\circ}$ ; patient was generally cyanosed, and apparently dying. Nothing further was done, and he died at 6 a.m.

Case 3. A baby aged eighteen months,—June 15th. The patient was seen at 9 a.m. in a comatose condition. Temperature  $106.5$ . The child was immediately placed in a cold bath, and the water frequently changed until the temperature was reduced to  $100^{\circ}$ . The comatose condition passed off in the bath. Until the crisis the child was kept covered only by a sheet, cold sponging was used at intervals, and the temperature did not exceed  $105^{\circ}$ . The convalescence was marked by an arthritis in an elbow joint.

A fourth case occurred similar in many particulars to Case 1, but I have no notes of it. The child had hyperpyrexial coma on more than one occasion, and the treatment adopted was as in Case 1 with a successful result.

Popular prejudice is still in favour of keeping the fevered patient warm, and this is often enough, at any rate, in general practice, to prevent efficient treatment by cold baths from being carried out. In the one fatal case of my series, I am sorry to say, the death of the patient was ascribed to my treatment, and the patient's friends, found a practitioner ready to take their side.

In cases of hyperpyrexia until popular prejudice is broken down some will follow our predecessors' example, of whom Dr. Baynard in his "*History of Cold Bathing*,"\* referring to

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\* *History of Cold Baths* in two parts. The first written by Sir John Floyer. The second treating of the genuine use of Hot and Cold water by Dr. Edward Baynard. 1732.

the result of a bathe in the Thames in a case of fever, writes as follows :—"For I hold ten to one on the Thames side against treacle, snake root and all that hot regimen which inflames and exalts the blood, breaks its globules, and destroys the man ; and then forsooth the Doctor sneaks away like a dog that has lost his tail and cries it was a pestilential malignant fever, and shows his care of the remainder, bids them open the windows, air the bed clothes, and perfume the room for fear of infection, and if he be of the right whining, prick-eared stamp, concludes as they do at Tyburn by a mournful ditty, a Psalm or a preservative prayer for the rest of the family ; so exit Prig with his starch'd formal chops, ebony cane, and fringed gloves."

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## PERISCOPE.

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### REPORT ON URINARY AND RENAL DISEASES.

BY PROFESSOR ROBERT SAUNDBY, M.D., LL.D., F.R.C.P.

#### DIABETES.

C. Manchot. *Ueber die Beziehungen der Glykosurie und des Diabetes Mellitus zur Syphilis.*—*Monatsh. f. prakt. Dermat.* xxvii.

Manchot believes that we should recognise a form of diabetes essentially dependent upon syphilis apart from that depending upon localised lesions of the central nervous system. He relates two cases of diabetes with pancreatic atrophy in syphilitic patients, and he does not consider that these were merely coincidences. In 12 out of 354 syphilitic patients, he has met with transitory glycosuria, which, in one instance, preceded, and in the others coincided with the appearance of constitutional symptoms. In most cases it lasted only a few days. He attributes this transient glycosuria to a curable affection of the pancreas, and perhaps the liver. In congenital syphilis he has never met with sugar in the urine.

Achard and Weil. *Du diabète fruste.*—*La Semaine Médicale*, 1898, p. 78.

The authors compare the condition they wish to describe with those cases of Bright's disease without albuminuria which admittedly occur. Their patients have been fat, gouty, over fed, alcoholic people. The diagnosis is made by the subcutaneous injection of ten grammes of glyucose, followed by an immediate examination of the urine. In healthy persons no sugar appears in the urine, but in diabetes or people constitutionally predisposed to diabetes sugar is found.

Achard and Weil. *Imperméabilité rénale et hyperglycémie dans le Diabète*.—*La Semaine Médicale*, 1898, p. 40.

The authors describe a case of slight diabetes the permeability of whose kidneys was indicated by the methylene blue test. Six weeks later he had an attack of cerebral hæmorrhage, when albumen in abundance appeared in the urine, at the same time the kidneys became impermeable to methylene blue, the sugar in the urine diminished notably, while the blood contained as much as 5 parts per thousand. They consider that this case shows that hyperglycemia depending upon renal impermeability may supervene during the course of diabetes.

Schupper, F. *La glycosurie des diabétiques aux diverses heures de la journée*.—*Bull. d. Soc. Lancisiana d. Osped. di Roma*, xvii., 2.

Schupper has examined the urine of three cases of diabetes at different periods in the twenty-four hours, and found that the maximum quantity of sugar was passed between eight and ten a.m. As the day advanced the quantity diminished irrespective of the amount of hydrocarbons ingested, and fell to a minimum during the night. Schupper concludes that the morning urine should always be examined when it is desired to be sure whether sugar persists, and that when carbohydrates are added to the diet they should be eaten, at first at any rate, in the later part of the day.

Lépine, R. *Diabetes in France*.—*British Medical Journal*, 1898, vol. ii., p. 997.

Professor Lépine seeks to controvert the conclusions of Bertillon that there has been a great and progressive increase of diabetes mellitus in Paris during the last thirty years by

analyzing the statistics of the Lyons Hôtel-Dieu, which indicates that the ratio of deaths from diabetes to total deaths has not varied since 1880. [With respect to this it may be recalled that Dr. Bertillon laid great stress upon the increase of the disease amongst the well to do. and not in those classes who use the hospitals.—Rep.]

Bond, C. Hubert. *Remarks upon the value of Uranium Nitrate in the Control of Glycosuria.*—*The Practitioner*, New Series, Vol. viii., p. 257.

The author has used uranium nitrate in eight cases of insanity associated with glycosuria. In one only were there other symptoms of diabetes. In all the sugar disappeared under treatment by small doses of uranium nitrate. Three grains twice or thrice daily was the usual dose employed, and no dietetic restrictions were prescribed. There were no gastro-intestinal troubles and no albuminuria.

Norway, N. E. *Intestinal Antiseptics in Diabetes.*—*Brit. Med. Journal*, 1898, Vol. ii., p. 1812.

Cases of "diabetes" are from time to time reported as cured by all sorts of remedies, none of which prove efficacious when tried systematically upon well-marked cases. The two cases here related are of this kind. The first was a man of 23, urine contained "a good deal of sugar;" cured without dieting by "a mixture containing strychnine and boracic acid." The second was a boy aged 18, passing urine of sp. gr. 1043, reduced by fermentation to 1002.5. He was dieted on skim milk and given —  $\mathcal{R}$ . *Acidi borici* gr. xx., *glycerini* ʒ j., *liq. arsenici hydrochlor.* ʒ v., *liq. strychninæ hydrochlor.* ʒ x., *aquam ad* ʒ j. In three months he was quite well.

Saundby, R. *Curds as an Article of Diet in Diabetes.*—*Brit. Med. Journ.*, 1898, Vol. ii., p. 932.

A correspondent having asked the Editor's opinion of the suitability of junket or curds for the use of diabetic patients, Dr. Saundby replied that curds contain so much whey that the quantity of sugar is not reduced except so far as it is converted into lactic acid. If the whey is expressed the curd becomes less

digestible. In kefir or fermented cow's milk the sugar is destroyed by fermentation, and this can be obtained from the Aylesbury Dairy Company. Many diabetics can assimilate a certain amount of milk sugar, so that half a pint to a pint of milk a day may be often allowed, but its suitability for each case must be determined by experiment.

Edgeworth, J. H. *Effects of Thyroid in Diabetes*.—*Brit. Med. Journ.*, 1898, Vol. ii., p. 514.

Edgeworth states in connection with the observation that healthy patients taking thyroid gland become glycosuric, that a diabetic patient under ten grains daily of thyroid doubled the excretion of sugar.

Clowes, E. F. *Diabetes Insipidus treated by Amyl Hydrate and Paraldehyde*.—*Brit. Med. Journ.*, 1898, Vol. ii., p. 129.

The case was that of a girl, aged 20, passing over 200 oz. of urine daily. After many drugs had been tried amyl hydrate (? hydride) was given at bedtime in doses beginning with 3 ss. and rising to 3 iij. The urine fell to little over 100 oz. after about three weeks' treatment, but as the patient "developed a great craving" for the drug, paraldehyde was substituted for it and "seemed to have the same effect on the amount of urine." The dose of paraldehyde is not given.

#### BRIGHT'S DISEASE.

Rempieci, G. *Sulle lesioni renali nella infezione malarica*. *Policlinico*, Vol. ix., xi., pp. 197, 278. 1898.

The author, from experience gained at the S. Spirito Hospital in Rome, finds that albuminuria occurs in about six per cent. of all cases of malaria. This may be due to acute or chronic nephritis, to primary or secondary contracting kidney, or to amyloid disease. Nephritis hæmo-globinurica he regards as dependent upon the hæmo-globinuria and not upon the malaria. In malaria there may be oedema without albuminuria. Malarial nephritis is not caused by the malaria parasite but by the toxic products which are eliminated through the kidneys. The treat-



ment is that of malaria, in the first line quinine, then iron and arsenic.

Merk, L. *Dermatoses albuminurica*. Von Dr. L. Merk.—*Arch. f. Dermatol. u. Syph.*, xliii., p. 469. 1898.

Merk describes Eczema albuminuricum as a circumscribed papular chronic eczema of elderly people, situated frequently on the leg, intensely irritable and obstinate, but which may heal spontaneously with formation of pigment, leaving dark brown stained smooth patches.

Pruritus albuminuricus is as chronic as the pruritus of diabetes or of old age.

Urticaria albuminurica generally precedes the pruritus. Erythema is more rare, and is usually met with on the hands and forearms, sometimes with crusts and blebs.

Francis, L. A. *Morphine in Uræmic Eclampsia*.—*Brit. Med. Journ.*, 1898, Vol. ii., p. 152.

Francis records a case of puerperal eclampsia, urine solid with albumen on boiling, treated by hypodermic injection of morphine gr.  $\frac{1}{2}$ , pilocarpine gr.  $\frac{1}{3}$ ; and ten hours later, morphine gr. i., and pilocarpine gr.  $\frac{1}{3}$ . She recovered, and the recovery is attributed to the treatment.

#### MISCELLANEOUS.

Baginsky, A. *Pyelonephritis in Kindesalter*.—*Arch. f. Kinderheilkunde*, xxii. p. 232.

Four cases reported had in common, 1, marked dyspeptic symptoms, loss of appetite, vomiting, and pain in the renal region of long duration; 2, constipation, and in one case membranous discharge from the bowel; 3, great variation in the state of the urine, which may be normal, clear, and free from all morphological elements, or full of pus and mucus; 4, a decided, but not regular, intermittent type of fever; 5, the presence of quantities of the bacillus coli in the urine. Baginsky doubts whether the bacillus coli is the cause of the trouble, for he has often seen this organism in the urine of children, who

presented no symptoms of disease, and certainly did not suffer from pyelonephritis.

Smyth, J. *Diagnosis of Pyelitis*.—*Brit. Med. Journal*, 1898, vol. ii., p. 152.

Smyth records a case in which the kidney affected was detected by seeing, with the cystoscope, pus pouring into the bladder from the left ureter. Patient had been treated for cystitis for five years, and during that time his bladder had been assiduously irrigated!

Comby, J. *Movable Kidney in Children*.—*Brit. Med. Journal*, 1898, Vol. ii., p. 1154.

Comby has found mobility of the kidney to be fairly common in children, and he attributes it to congenital causes or injury. The symptoms are variable but the condition if looked for will be found. A flannel bandage wound several times round the body may afford relief, but he recommends fixing the kidney to the posterior wall of the abdomen by operation whenever the symptoms are urgent and persist. Drs. Burn Murdoch, G. F. Hill, and Theodore Fisher confirmed the occurrence of this condition in children, although the first regarded it as rare.

Einhorn, Max. *Movable Kidney and its Treatment*.—*New York Medical Record*, 1898, ii., p. 220.

Max Einhorn, after giving a good account of this condition, which was first recognised and described by Rayer, expresses his opinion that operative treatment should be rarely resorted to, and only after the suggestions and remedies of the physician have been completely exhausted. He states that operation is often followed by no improvement in the condition of the patient. He recommends what is practically a course of Weir-Mitchell treatment and the use of a suitable bandage.

Becher and Senhoff. *Körperform und Lage der Nieren*.—*Deutsch. Med. Wochenschr.*, xxiv., 32, 1898.

The authors have examined 24 Samoan women who were in Berlin, and find that palpable kidney is to be met with among these uncivilised people among whom our vicious style of

clothing is not in question. The authors have further established the following formula :—

$$\text{Index} = 100 \times \frac{\text{Jugulo-pubic distance}}{\text{Abdominal circumference.}}$$

The jugulo pubic distance is from the sternal notch to the upper border of the symphysis pubis. The greater the jugulo-pubic distance and the smaller the abdominal circumference the more certainly may we expect to feel the kidney. The index in Litten's Clinic was 77, among the Samoans 75. Below this palpable kidneys are not to be looked for.

Roosing, T. *On Obscure Hæmorrhage from the Kidney.*—*Brit. Med. Journal*, 1898, vol. ii, p. 1547.

Undoubtedly cases of hæmaturia of renal origin are not uncommon in which the cause is very obscure, owing to the absence of any evidence pointing to either of the usual causes of hæmorrhage. So true is this that some of the most careful clinicians have admitted the occurrence of a nervous or angio-neurotic renal hæmorrhage. Roosing's paper is a protest against the too easy acceptance of this view. He urges that in all doubtful cases an exploratory incision should be made into the bleeding kidney, because either stone or tumour may be present without symptoms. He relates a case where he believes the hæmaturia was due to injury of the upper part of the kidney by compression between the stays and the liver.

Burn and Goff. *The Value of Cantharides in Hæmaturia.*—*Brit. Med. Journal*, 1898, Vol. ii, pp. 808 and 1551.

The reporters relate cases of hæmaturia cured by five minim doses of tincture of cantharides three times a day. Unfortunately they do not venture upon any precise diagnosis of the source of the bleeding or its cause, nor does either give sufficient data to enable his readers to form an opinion. The cessation of bleeding is a natural process, and hæmostatic drugs are constantly credited without cause with results due to nature alone.

Bloch. *Resection of Renal Tissue as an aid to Diagnosis.*—*Revue de Chirurgie*, June, 1898.

The author recommends resection of small portions of renal

tissue for microscopical examination, in order to distinguish between inflammatory tissue and new growth or tuberculosis, which without such examination may be quite impossible.

Morley, Fletcher. *Green-coloured Urine*.—*Brit. Med. Journal*, 1898, Vol. ii., p. 1686.

In this case the pigment was proved to be methylene blue, although its presence in the urine was not accounted for. The subject was a girl aged 12!

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## REPORTS OF SOCIETIES.

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### BRITISH ORTHOPÆDIC SOCIETY.

AT a meeting held in the Royal Infirmary, Derby, on May 27th, Mr. Gentles in the chair, Mr. William Thomas showed a patient in whom the left popliteal nerve had been injured by a kick from a horse, and talipes equino varus occurred. Neurorrhaphy having failed he performed tarsectomy. The result appeared to be excellent.

Mr. Tubby said that the case was a most interesting one, and pointed out how difficult and in some cases impossible it is to get the ends of a divided nerve together when the division occurs close to where the trunk breaks up into branches.

Mr. Robert Jones called attention to the slight amount of power still remaining in the extensors of the toes, showing that the nerve was not entirely divided, or else that some union had occurred. He could not understand how the tarsectomy could prevent the foot droop.

Mr. Bennet cited the analogy of a case under his care, where the ulva nerve was injured by fracture of the lower end of the humerus without division, but at the operation the sheath alone was found to be intact, the nerve elements being completely divided and retracted inside it. In that case  $1\frac{1}{2}$  inches of a rabbit's sciatic nerve was inserted with success. He would like to ask Mr. Thomas why he did not try nerve grafting.

Mr. Muirhead Little mentioned a case in which the peroneal nerve had been divided six years before it came under his care, in the course of an operation for division of the biceps tendon. Talipes equino varus had resulted. He cut down and found a gap of about two inches. The upper end of the nerve was bulbous, and the lower a good deal wasted. He excised the ends, and succeeded in getting the cut surfaces in apposition by flexing the knee. No benefit resulted, however, probably because the injury was of such long standing. He asked whether Mr. Thomas might not have got the ends together in his case by a similar manoeuvre.

Mr. Luke Freer remarked that after tarsectomy in ordinary talipes equino varus there is often a relapse. To avoid this it might be well to continue with stimulation of the nerve by battery and foot kinetico.

Mr. Thomas, in reply, said that in addition to tarsectomy he divided all the flexor tendons. He thought that union of the bones caused rigidity of the foot, and he laid great stress on the importance of removing a large piece of skin in tarsectomy. The nerve was never completely divided. This fact would probably account for the slight power left in the extensors, and for this reason he refrained from nerve grafting. He tried flexion of the knee, but did not find that it approximated the ends of the nerve to any extent. He did not think that the battery was of much use. The voluntary use of a muscle was of far more use in stimulating development than electricity or massage.

Mr. Carwardine read a paper on a case of talipes equino varus treated by Phelps's latest operation. The chief points in the operation are—

1. Thoroughly to disinfect the skin.
2. Constant irrigation with an antiseptic during the operation.
3. To make an open incision on the inner side, if the skin be short.
4. To cut all the parts in order of their resistance, first dividing the tendon Achilles if tense; then tibialis posticus, abductor

pollicis, plantar fascia, flexor brevis, long flexors, deltoid ligament.

5. Then, when necessary, linear osteotomy of the neck of the astragalus.

6. Resection of a wedge of bone from the os calcis, the point meeting the osteotomy wound through the astragalus

The operation was performed on June 30th, 1898. The boy did well, and on November 14th the following note was made: foot perfectly straight, walks fairly, good flexion, extension, inversion, and eversion. Good arch to foot, the normal length of the foot preserved and no tenderness of the scar.

He said that the special feature of the complete operation is the alteration of the bony axis of the foot without diminution of its length, the inner border of the foot being lengthened. The transverse tarsal joint and the great synovial membrane of the foot are not interfered with, so that the foot preserves its natural mobility and elasticity.

Mr. Muirhead Little said that he had had some experience of Phelps's operation, and had got very good results and had seen no tendency to relapse, or any troubles due to the scar. Phelps long ago advocated linear osteotomy of the neck of the astragalus in bad cases, but he had only once found it necessary. He thought that cases requiring the excision of an additional wedge from the os calcis must be very rare. It was important that the wound surfaces should be kept apart as long as possible. Hence healing must be very slow—generally 6 weeks. He has slid a piece of skin from the fore part of the foot over the gap, in one case with success, and very little scar resulted, but the use of the foot was not increased thereby. He thought it better to lengthen the inner border of the foot by Phelps's operation, rather than to shorten the outer border by tarsectomy. Relapse was prevented by the chord of the arch being permanently interrupted.

Mr. Keetly raised the objection that the scaphoid was not replaced in its proper position over the head of the astragalus, in

the operation as represented by Mr. Carwardine, and he thought that the scar must tend to cause relapse. The deformity being curved and not angular, it did not matter much at what part of the curve the wedge in tarsectomy was removed. The large granulating surface in Phelps's operation was a danger.

Mr. W. Thomas said that he had not much experience in this operation, but he had a large one in tarsectomy. He saw no advantage in this operation over an ordinary tarsectomy. Taking out a wedge from the outer side made it only an interior tarsectomy.

Mr. Robert Jones said that the main thing in tarsectomy was to remove enough bone. He objected to the scar of Phelps's operation. He preferred to all others Lund's operation of astragalectomy, which, in his hands, had yielded most satisfactory results. The after treatment was, in all these operations, most important.

Mr. Carwardine in reply said that he thought the rigidity caused by tarsectomy was objectionable.

Mr. Carwardine read a paper on Congenital Absence of Fibula with Intra-uterine Fracture of the Tibia. The patient was five weeks old. The right leg was much shorter than the left, and the thigh half an inch shorter. The leg was bent rather below the centre, almost to a right angle, and over the convexity was an umbilicated and somewhat adherent seal. The fibula and all the elements of the fifth toe were absent. The tibia was sharply bent upon itself almost to a right angle, with some thickening of the part. The tendo Achillis and skin posteriorly were very tight (skiagrams and sketches shown). When the mother was two months pregnant she was nearly run over by a carriage and pair. To escape the danger she made a sudden dart forwards. He corrected the deformity with great difficulty, owing to the hardness of the bone and terseness of the tendo Achillis, which he divided. He was of opinion that the condition was a true greenstick fracture of one tibia across the other in utero by contraction of the parietes upon a bone which lacked the support of the fibula. The absence of the fibula and fifth toe were developmental.

Mr. Robert Jones thought that no theory of etiology fully accounted for the condition found. The theory of intra-uterine fracture had serious objections. The scar on examination gave no microscopic evidence of real scar tissue; on the contrary, the lines of continuity in the layers were not broken, but apparently only thinned by pressure. The angular deformity of the tibia gives no support to the theory of fracture. It is very difficult to conceive of any direct injury to the mother giving rise to a compound fracture of the tibia, which is surrounded by amniotic fluid. The large proportion of cases giving evidence of congenital irregularities of toes seems to suggest a joint causal relationship. Mr. Jones described some of his own cases, the best of which represented only partial absence of fibula and eight toes.

Mr. W. Thomas asked if the biceps was present in Mr. Carwardine's case.

Mr. Luke Freer referred to his case recorded in Vol. 1 of the British Orthopædic Society's Transactions, in which the fibula seemed to shade away with the tendo Achillis.

Mr. Carwardine replied that he could not detect any abnormality at the knee.

Mr. Carwardine read a paper on Tubercular Abscesses and their radical cure by thoroughly scraping and irrigating the cavity. The three cases he had operated on with complete success were—

1. Large abscess of the thigh from tuberculous disease of the pubes.
2. Large tuberculous subgluteal abscess of the thigh, probably of spinal origin.
3. Psoas abscess, extending over the whole front of the thigh, the result of tuberculosis of the vertebræ.

Mr. Luke Freer exhibited two skiagrams, one of congenital displacement of the left femur, and the other of eight coxa vara associated with lateral curved femora of rachitic origin.

Mr. Tubby read notes of Spastic Hemiplegia with flexion of elbow and wrist and pronation treated by open section of flexor



tendons, especially flexor carpi radialis and detachment of the pronator radii teres from its insertion. A hole was then made in the interosseous membrane, and the tendon passed round the back of the radius to its outer border and fixed, thus reversing the action of the muscle. Patient after six weeks could pick up a pin. He kept the wrist during this time midway between flexion and extension by splints.

Mr. Keetley opened a discussion on coxa vara. He described types of the two chief varieties which commence in adolescence. The deformity was rachitic in origin. The partial or even total absence of rachitic change in other parts was no disproof of this, as the older the patient, the more localised the rachitic changes tend to be. The various modes of osteotomy which had been carried out or proposed including a new method, were described. In theory the neck of the bone should be operated on, in practice the trochanteric region was more convenient. Decreased angle of the neck and shaft formed the striking feature on a first glance at the deformity, but the main changes were in the neck itself, especially near the head. In fact coxa vara was a rachitic deformity of the upper epiphysial region of the femur. The deforming influences sometimes extended far down the shaft. Compensatory genu valgum was common. The speaker called attention to a peculiar expansion of the facial bones giving prominence to the eyeballs and width and flatness to the upper half of the face. Coxa vara in cases of early rickets was very common indeed, but during adolescence were rare. The commencement of the flood of modern literature on the subject dated from the speakers own paper in the *Illustrated Medical News* for September 29th, 1888. The hip joint was healthy in these cases. For this and for other obvious reasons, excision was not justifiable.

Mr. Robert Jones said that he thought that a transtrochanteric osteotomy would do all that was needed in these cases.

Mr. Tubby said that it would be advisable to divide the adductors, and after doing transtrochanteric osteotomy, to transfer the attachment of the abductors from the great trochanter

to the lower fragment, so as to increase their power of action, and abduct the shaft instead of the neck of the femur.

Mr. Muirhead Little said that he found great difficulty in accepting the theory that late rickets was the cause of these remarkable deformities. The deformity found in infantile coxa vara was very different from the adolescent variety. In none of the extremely rickety skeletons in the London museums was there anything approaching the deformities depicted by Kocher and others to be found. It seemed to be a process *sui generis*. Charpertie had shown that osteitis might cause the deformity.

Mr. Keetley, in reply, said that he did not think a single linear osteotomy was enough. The upper fragment in such a case would be free, and it would be difficult to maintain apposition and abduction. It was very different when ankylosis existed, as in coxitis, when a linear osteotomy sufficed, because the upper fragment was fixed. Coxa vara was very common in infantile rickets, and often accompanied genu valgum; indeed, he thought it might precede and cause in-knee. He would admit that coxitis or tubercle of the bone might be a rare cause of coxa vara, but such cases must be exceptional. Traumatism was often noted, but he thought that it had no causal connection with the deformity, but he believed that some cases described as separation of the epiphysis were really cases of coxa vara.

Mr. Jones proposed, and Mr. Freer seconded, a cordial vote of thanks to Mr. Gentles for his conduct in the chair, and to the Honorary Medical and Surgical Staff of the Infirmary for the use of the Board Room.

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## ACADÉMIE DES SCIENCES.

*Séance du 26 juin, 1899.*

NOTE PRÉSENTÉE PAR LE PROFESSEUR D'ARSONVAL.

DE L'ACTION THÉRAPEUTIQUE DES COURANTS  
DE HAUTE FRÉQUENCE DANS L'ARTHRITISME.

PAR LE DR. G. APOSTOLI.

Le Dr. Apostoli vient compléter, avec la collaboration de son assistant A. Laquerrière, les conclusions des deux notes qu'il a déjà publiées (en 1895 et 1897) sur l'action thérapeutique des courants de haute fréquence qui corrobore les découvertes physiologiques du Professeur d'Arsonval.

Il apporte la justification de trois épreuves différentes et parallèles qui se fortifient mutuellement :

(A)—*Épreuve clinique.*—Elle repose sur l'examen de 913 malades qui ont subi au total (tant à sa clinique que dans son cabinet) 24,371 applications, tant générales que locales, des courants de haute fréquence depuis janvier 1894 jusqu'à juin 1899.

Cette épreuve clinique s'accuse d'une façon à peu près constante par la résultats symptomatiques suivants :—

Restauration progressive de l'état général ;

Relèvement des forces et de l'énergie ;

Réveil de l'appétit ;

Meilleur sommeil ;

Meilleure digestion ;

Réapparition de la gaieté, de la résistance au travail et de la facilité pour la marche.

(B)—*Épreuve chimique.*—L'examen des urines fait par M. Berlioz sur 469 malades, et répété 1,038 fois depuis 1894, démontre que, sous l'unique influence des courants de haute

fréquence, on observe les modifications principales suivantes dans l'émission des excréta urinaires :—

Amélioration de la diurèse et élimination plus facile des excréta ;

Suractivité plus grande des combustions organiques ;

Tendance du rapport de l'acide urique à l'urée à se rapprocher de la moyenne normale, c'est-à-dire de 1/40°.

(C)—*Epreuve hémato-spectroscopique d'après la méthode du Dr. Hénocque*—Faites par le Dr. Tripet, depuis un an, sur 112 malades de la clinique du Dr. Apostoli, elle a été répétée 200 fois.

Cette épreuve corrobore les réponses cliniques et chimiques précédentes et démontre l'action puissante de ces courants sur l'activité de la nutrition qu'ils stimulent et régularisent à la fois.

Cet examen repose sur le double témoignage du dosage comparatif, avant, pendant et après le traitement électrique, de la proportion centésimale de l'oxy-hémoglobine et de son activité de réduction.

Si l'on utilise les courants de haute fréquence dans la thérapeutique des diverses manifestations pathologiques de l'arthritisme, voici les résultats généraux et sommaires que nous pouvons enregistrer aujourd'hui sous la seule influence des applications générales et locales, associées ou administrées isolément :—

1. Généralement nuisibles et contre-indiqués dans le *rhumatisme aigu*, ils peuvent quelquefois être favorables dans l'état *subaigu*, et sont très efficaces dans la plupart des formes *chroniques* du rhumatisme.

2. Ils peuvent très notablement améliorer l'état des *goutteux*, mais ils sont capables de provoquer, dans certains cas, au début de leur application, l'explosion d'un accès aigu.

3. Ils paraissent donner de bons résultats contre la *migraine* en prévenant quelquefois son retour périodique.

4. Ils sont une arme puissante contre certaines *névralgies arthritiques* (sciatique) par l'action éloignée, préventive et curative à la fois, des applications générales.

5. Leur action préventive peut s'exercer favorablement sur les diverses *lithiases* dont ils arrêtent ou retardent parfois l'évolution.

6. Les *varices* peuvent bénéficier des modifications dynamiques qu'ils impriment à la circulation périphérique.

7. Les *hémorroïdes* sont également justiciables soit de l'action secondaire des applications générales, soit de l'action directe, intra-rectale, des applications locales.

8. La *constipation* et la *dyspepsie* liées à l'atonie gastrique ou intestinale sont souvent utilement amendées par cette même médication.

9. L'*eczéma* est largement et immédiatement tributaire de l'effluation par les haute fréquences, comme il l'est, d'autre part, de l'effluation statique et retire également des applications générales les meilleurs bénéfices préventifs.

10. Les *troubles respiratoires dyspnéiques*, comme on les observe chez les *asthmatiques*, peuvent être utilement modifiés.

11. Les *congestions vasculaires* diverses qui sont sous la dépendance de l'arthritisme peuvent bénéficier de ce même traitement.

12. La *neurasthénie arthritique* est souvent curable par les haute fréquences, tandis que la *neurasthénie hystérique* relève avant tout de la *statique*.

13. Ce même traitement peut être utile dans certains troubles liés à l'*artério-sclérose*.

14. Sans action directe constante pour provoquer l'amaigrissement, le courant de haute fréquence, en régularisant le taux de la nutrition générale, peut enrayer ou combattre avantageusement l'*obésité* chez les *arthritiques*.

EN RÉSUMÉ, le Dr. Apostoli pense que, si le courant statique reste par excellence le mode électrique le plus actif contre les états hystériques, le courant de haute fréquence, sans être une panacée applicable à tous les cas indistinctement, est très efficace contre les principales manifestations pathologiques de l'*arthritisme*.

*C'est avant tout un médicament de la cellule et un modificateur puissant de la nutrition générale qu'il peut activer et régulariser en même temps.*

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## REVIEWS.

### CLINICAL LECTURES ON NEURASTHENIA.\*

THIS work is a collection of lectures, mostly post-graduate, delivered by the author on various occasions. To have issued these lectures in a compact and continuous form is we believe an advantage. The literature on the subject of Neurasthenia is now copious, but text-book descriptions are scanty and inadequate, and so the student and practitioner are often at a loss for a handy work of reference on the subject. There is also another advantage in making a systematic study of Neurasthenia, and that is to show the manner in which it responds to proper treatment. There is a somewhat prevalent idea that nervous diseases are not susceptible of being treated; as a matter of fact the opposite is the case. "Taking nerve diseases as a whole," says the author, "the largest group of cases that come before us in private and hospital practice is undoubtedly the functional one comprising, besides the subject of our studies to-day, migrainé and other paroxysmal neuroses, chorea and the wide domain of hysterical affections; and these either tend towards spontaneous recovery or yield to appropriate treatment." It is even probable that many diseases of the nervous system actually due to gross lesions are much more open to treatment than is generally supposed. This pessimistic attitude is in a considerable degree to blame for the neglect which even disorders such as neurasthenia incur at the hands of many physicians.

As defined by the author Neurasthenia is "an irritable weakness of the entire nervous system characterised by hypersensitiveness, tactile sensibility and special senses; by headache, inaptitude for mental work, disturbed sleep, and irritability, weakness, nervousness and vague pains, and usually accompanied by various phenomena referable to the vaso-motor and sympathetic systems." (p. 22.)

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\* Clinical Lectures on Neurasthenia By Thomas D. Savill, M.D.  
London: Henry J. Glaisher.

The writer describes two forms of the disease, cerebral and spinal, but states that both always occur together, that the cerebral or spinal symptoms may predominate in different cases. There are five chief predisposing causes. The condition is most common in (1) young adults, though it particularly states that no age is exempt. It is even met with in quite young children. In reference, however, to such cases, the author says it is often associated with asthenopia and errors of refraction. This is a statement with which we thoroughly agree. It is not however to be supposed that only in young children do visual defects cause neurasthenia. Adults not unfrequently show the same series of events, and in correcting errors of refraction, the neurasthenia symptoms disappear. The writer himself quotes cases bearing this out. The second factor in ætiology is sex. The writer says that while he believes neurasthenia to be equally common in both sexes, his experience shows that the greater number of cases are met with in males. This has been noticed by others as well, and many believe that there is a greater tendency to neurasthenia in males than in females. That (3) heredity is an important factor in the causation of this disease, there can be no doubt. Almost daily do we meet with evidence in support of this. (4) Occupations are in great measure to blame for many cases of neurasthenia, in clerks, cashiers, signal men, and all in a position of responsibility are apt to suffer, and especially so should there be family anxiety as well. The underpaid clerk with a wife and children is a case of neurasthenia *in posse*. In the fifth class of causes come morphinism, alcoholism and other habits which tend to undermine the tone of the nervous system. Overwork, emotion and strain, traumatism, dyspepsia, constipation and some others seem to act as exciting causes.

The writer enters fully into the clinical manifestations of the disease. "Nervousness," such as being easily startled, headache especially that form called "casque neurasthenia" by Charcot, disturbed sleep, night terrors and general weakness are important symptoms. The last may be very marked and be accompanied by great prostration and depression.

Restlessness is a very characteristic symptom. Some neurasthenic patients are continually "on the fidget." Sometimes there may be considerable difficulty in examining such cases. They generally show exaggeration of the reflexes, superficial and deep, but the author points out that there may be absence of the reflexes, a statement we have had occasions of verifying. Pains in the back and limbs and general hyper-æsthesia are well known symptoms, and used formerly to be described under the name of "Spinal Irritation," or "Rachialgia." There may be also numbness, tingling, and irritability of the special senses. The pupils may be widely dilated. Contraction of the visual field and hemianopsia may be present in severe cases of traumatic neurasthenia. Special mental symptoms are: Agoraphobia, timidity, loss of memory and inaptitude for intellectual work. The pulse may be rapid and weak and irregular. A particular feature is the manner in which some slight noise or excitement may cause the pulse to become at once rapid and irregular. Feelings of vertigo, faintness, and digestive disorders are common. The condition is essentially a chronic one, and comes on gradually, though when due to some definite cause, such as traumatism it may come on rapidly. There may be phases of temporary improvement or exacerbations, and there is a marked tendency to relapse.

In cases where an insane heredity exists there may be some danger of drifting into confirmed mental disease. There may be various complications, such as writer's cramp, habit spasm, chorea, and others. (Whether the author is altogether justified in considering these affections as complications when occurring in a neurasthenic patient is open to criticism; personally we should not so class them). Angio-neuroses—acroparæsthesia as an instance—or certain forms of erythema may be met with.

Under the head of Pathology of Neurasthenia, the writer considers four groups of morbid processes. (a) A faulty digestion with frequently constipation producing a toxic state of the blood, and as a consequence a poorly-nourished nervous system. (b) A weak and overworked nervous system,



often due to some special form of exhaustion, such as an illness.

(c) *Fatigue Neurasthenia*—a form occurring in persons whose other organs are healthy, but whose nervous systems are overstrained. These are cases often met with in professional classes.

(d) *Emotion and Traumatic Neurasthenia*. It seems to us that there is considerable overlapping in this classification of processes. Many of the causes met with in practice could be more simply classed than the author has done.

The question of treatment is an important one, and the author enters into it with great care and detail. There is no class of cases where a judicious line of treatment is of greater importance than neurasthenia.

There are many cases where most satisfactory results can be obtained, and we can bear out many of the instances quoted by the writer, but there will always remain a contingent of patients who are hopeless—who drift from one physician to another, and whose very existence becomes a burden to themselves and those about them. Possibly clearer views on the subject of neurasthenia may reduce the number of such cases, for as we have already remarked, there is no little confusion in the minds of some physicians concerning neurasthenia, hysteria, and hypochondriasis.

In conclusion, we feel that the writer has produced a very useful book. In many respects it is somewhat drawn out; there is some needless repetition, here and there evidence of careless proof-reading. Taken as a clinical account of neurasthenia, the book will not fail to be of use.

DOUGLAS STANLEY.

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#### GLASGOW HOSPITAL REPORTS.\*

WE are glad to see that the suggestion, which dates from 1896, to establish an annual volume of Glasgow Hospital Reports has at last been carried out, the result being the present volume:

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\* Glasgow Hospital Reports. Edited by Geo. S. Middleton, M.A., M.D., and Henry Rutherford, M.A., M.B. Vol. i.

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The large amount of clinical material furnished by the Glasgow Hospital could best be realized by the publication annually of some record of the work carried out in the hospitals of that city.

The first volume contains eighteen articles on a great variety of subjects, most of which bear the stamp of original work of high value. The first is an article by Dr. M'Call Anderson on Intra-cranial Tumours, illustrated by cases which form examples of uncommon or interesting localisations. These cases are carefully recorded and in many instances followed up by *post mortem* verification. An interesting case of granulum fungoides is described by Dr M'Vail. The patient was a shepherd, aged 43, who was kicked on the right temporal region by a sheep. The skin did not appear to be broken, but within ten minutes a raised bruise appeared at the site of injury. This increased as time went on and other reddish blotches were observed in different parts. Later, large swellings appeared over the head and face and extended to such degree that the eyes became obliterated and the countenance unrecognisable. "The nose was four times the normal size, the cheeks protruded like fists, and just above the nose was a projection like an egg. The projection over the original seat of injury was also of egg-size. The lobes of the ears were enlarged. The growths over the cranial region were somewhat exaggerated and bled slightly. The surfaces were dry, nowhere scaly. The colour was generally dusky red. The swellings were entirely in the skin and movable with it, that over the occipital region being least movable. Over the arms were scattered irregular maculæ and tubules, varying in size from a lentil to a bean, and on each upper arm a much larger projection, that on the left being larger than that on the right. Over the surface of the body were small elevations, more numerous on the anterior than the posterior surface." The internal organs showed no lesions. The patient was treated with potassium iodide and chaulmogra oil. Later on he rapidly developed a high degree of pyrexia during which there was considerable lessening of the swellings. Later on the swellings resumed the same size as on admission. Pathological

examination was made of fluid drawn from the deeper parts of some of the nodules. This showed the presence of a bacillus with rounded ends, sometimes forming threads in culture aerobic and growing readily at room temperature, forming in twenty-four hours small rounded greyish-white colonies of agar. These rapidly coalesced on gelatine; colonies developed on the surface and in the depth of the medium with subsequent liquefaction. The organism stained with injections and was not decolourised by gram. It appeared to possess flagella. Injection into a rabbit was followed by a distinct swelling at the point of inoculation with subsequent secondary nodules in neighbouring glands.

There is a useful article on the "Ophthalmoscope in Medical Practice," which is distinctly useful as it emphasises routine examination of the fundus in different medical cases. Mr. Newman contributes an important contribution on "Malformation of the Kidney and Displacements without Mobility." In this article are gathered together very many observations of cases illustrative of both congenital and acquired abnormalities. The article is carefully illustrated and forms an important contribution to the work of systematising this rather neglected subject. Another article to which we would particularly direct attention is that on the Pathology of the Coronary Arteries of the Heart, by Dr. Lindsay Steven, in which he analyses 238 cases. The conclusions to be drawn from this analysis are carefully summed up at the end of the paper. These conclusions deal with the coronaries of angina pectoris, Bright's disease, fatty morphoses, etc.

In conclusion, we heartily congratulate the editors and editorial committee on the valuable series of reports contained in this volume, and we hope that their future efforts will be as successful.

SELECTED PAPERS ON STONE, PROSTATE, AND  
OTHER URINARY DISORDERS.\*

MR. REGINALD HARRISON'S writings on the subject of the surgical diseases of the urinary organs are always interesting, and the volume under review well maintains the author's reputation. The book consists of articles which have for the most part been published since 1893, and which have appeared in various periodicals. The first essay is on "Vesical Stone and Prostatic Disorders," and in it the author deals chiefly with the subject of enlarged prostate with recurrent formation of vesical calculi, insisting on careful and regular washing out of the bladder after a stone has been removed from a patient suffering from enlarged prostate. If the stone recurs, Mr. Harrison suggests that double vasectomy should be performed at the same time as the stone is removed. As might be expected, when the author's writings are called to mind, preference is given to double vasectomy as compared with double castration for the treatment of enlarged prostate, though it is admitted that improvement after the former operation is not so rapid as after the latter. A good deal has been recently written by various surgeons, especially by Mr. Milton, of Cairo, on the subject of perineal lithotomy, and here Mr. Harrison records his personal experience of the operation, an experience which is essentially a favourable one. He advocates its performance when the stone is large and when there is much cystitis present, the latter condition being benefited by the subsequent drainage of the bladder through the perineal wound.

Another interesting paper is the one on "The Treatment of Albuminuria by Renipuncture," a method of treatment introduced by the author. The chief conditions in which, it is suggested, the operation may be useful, are—(1) Scarlatinal nephritis with suppression of urine, and (2) Scarlatinal nephritis, when "so far as the renal symptoms are principally concerned, the tendency is not in the direction of recovery." Successful

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\* Selected Papers on Stone, Prostate, and other Urinary Disorders. By Reginald Harrison, F.R.C.S. London: J. and A. Churchill. 1899.

cases are quoted, and Mr. Harrison attributes the good result to relief of tension.

We have referred to only a few of the essays in this volume, but there are others equally interesting. Mr. Harrison brings to bear upon the subjects of which he treats, a long experience and sound judgment, and the result is that this collection of papers is of the greatest value, and should be read by every surgeon interested in surgical urinary disorders.

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#### SAJOUS' ANNUAL AND ANALYTICAL CYCLOPÆDIA OF PRACTICAL MEDICINE.\*

THESE volumes of this series in every way maintain the high standard of use of his works. The second volume contains the articles on "Cirrhosis of the Liver" by Prof. Adams; "Diabetes," by Prof. Lépine; and many others which strike us as being well written and carefully up to date. The manner in which recent articles are incorporated is a distinct feature of this system and is at once clear and time-saving.

In Volume iii we notice particularly some very able articles such as that on "Cretinism" by Prof. Osler and Dr. Norton, of Baltimore, "Exophthalmic Goitre" by Prof. Putman, of Boston, and "Goitre" by Prof. Adams. Perhaps one of the ablest articles in this volume is that by Dr. Esdridge on "Hysteria." Although the literature on this subject is now most extensive, still the description given by the author is valuable and instructive.

It must not be supposed that Sajous' Annual is confined to Medicine alone. The articles on surgical subjects, therapeutics, and the special departments, are also of high excellence, and the work when complete will form an essential addition to every medical library.

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\* Sajous' Annual and Analytical Cyclopædia of Practical Medicine, Vols. ii. and iii. The F. A. Davis Company.

## PROPOSED CONSULTANTS' INSTITUTION.

A meeting of Consultants and Specialists was held at the Medical Institute, on Thursday, July 6th, 1899.

*Present*, Dr. Saundby in the chair. Drs. Warden, Douglas Stanley, Thomas Wilson, Russell, Jordan, Kauffmann, Lewis, Lamb, Felix Vinrace, Simon, and Foxcroft; Messrs. Morrison, Furneaux Jordan, Bennett May, Wood White, Thomas, Smallwood Savage, Wright Wilson, Gilbert Smith, Eales, Leedham-Green, John W. Taylor, Haslam, Lucas, Hall Edwards, Martin, Heaton, Jameson Evans.

Apologies were received from Mr. Barling, and Drs. Carter, Short, Purslow, Stacey Wilson, and Leslie Phillips.

The Chairman briefly recapitulated the proceedings which had taken place with regard to the proposed Consulting Institution and proposed:—

That in response to the enquiry conveyed through the Lord Mayor of Birmingham this meeting of Consultants and Specialists confirms the statement that many of the recognised Consultants and Specialists are prepared to see for half-a-guinea those persons who satisfy them that the usual fee is beyond their means.

This was seconded by Mr. Morrison, and in answer to Mr. Priestley Smith, the Chairman explained that this was intended to be the answer to be conveyed to the Lord Mayor in response to his letter of June 16th

After remarks by Messrs. Priestley Smith, William Thomas, Vinrace, Bennett May, Heaton, J. F. Jordan, Thomas Wilson, and Dr. Kauffmann, the resolution was put and carried *nem. con.*

It was proposed by Mr. Priestley Smith, seconded by Mr. J. W. Taylor and carried:—

That the Chairman of this meeting be requested to convey the resolution passed at the General Meeting of the profession together with the above resolution to the Lord Mayor.

The Chairman then proposed, Dr. Kauffmann seconded, and it was resolved *nem. con.* :—

That the following be appointed a Committee to represent this meeting, to watch over the interests of the profession in this matter, to take any steps that may be urgently needed in those interests, and to summon another meeting of Consultants and Specialists if required. The Chairman, Dr. C. J. Lewis, Mr. Gilbert Smith, Mr. Eales, Mr. Priestley Smith, Dr. Thomas Wilson, and Mr. J. W. Taylor.

### **New Books, etc., Received.**

- From Macmillan and Co.—  
Allbutt's System of Medicine. Vol. vii.
- From Edward Arnold, London—  
Manual of Human Physiology. By Leonard Hill. M.B.
- From J. and A. Churchill, London—  
The Wasting Diseases of Infants and Children. By Erstace Smith, M.D.
- From H. K. Lewis, London—  
Extra Uterine Pregnancy. By John W. Taylor, F.R.C.S.
- From John Wright and Co., Bristol—  
An Introduction to Dermatology. By Norman Walker. M.D.
- From the Scientific Press Limited—  
The Pocket Case Book for Nurses.

\* \* \* Authors can have reprints of articles at the following rates :—

|                       |     |      |         |
|-----------------------|-----|------|---------|
| Not exceeding 8 pages | ... | 8/-  | per 100 |
| " 16 "                | ... | 12/6 | "       |

The re-arranging of the type is the principal cost in the production of these reprints, so that smaller numbers will be the same price. Larger numbers at a proportionate reduction.

The Subscription to the *Birmingham Medical Review* is 6s. per annum, post free.

NOTICE.—*All Communications, Exchanges, and Books for review, should be sent direct to the Printers and Publishers, Messrs. Hall and English, 71, High Street, Birmingham.*

THE  
BIRMINGHAM MEDICAL REVIEW.

SEPTEMBER, 1899.

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ORIGINAL COMMUNICATIONS.

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KAKOETHES MEDENDI.\*

BY THOMAS WILSON, M.D., F.R.C.S. (ENG.).  
ASSISTANT OBSTETRIC OFFICER TO THE BIRMINGHAM GENERAL HOSPITAL,  
PHYSICIAN TO THE INFIRMARY, ETC. ETC.

AT the outset perhaps it is as well that I should try to explain what the title of this paper is really intended to mean. The word *kakoethes*, originally meaning badness, came to be applied in a medical sense to an obstinate malignant complaint, and then figuratively to an incurable passion for something or other. *Mederi* is to heal or to cure: I do not however intend to use the word in this sense, but merely as meaning to treat disease, a very different thing. The phrase *kakoethes medendi* may thus be taken to mean an incurable passion for treating and being treated for disease, and I propose to examine some aspects of this passion, not only as it is found in those who make it the business of their lives to attend on the sick and suffering, but as it is found to pervade the whole body politic.

To illustrate my meaning, suppose any one of us to go forth to his work one fine morning with an ailment or symptom that is fairly common and therefore presumably well understood of the people; such a complaint for instance as a common English cold, or a bit of a cough. With what delight and interest will

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\* Read before the Graduates' Club, on March 21st, 1899.



the symptoms be investigated by one's friends ; what varied names will be found to apply to the complaint ; what marvellous stories will be told of persons who have suffered in just the same way, and who have recovered or died ; and what fearful and wonderful suggestions and recommendations as to treatment will be made. For a cold one will recommend a Turkish bath, or a hot bath, or a mustard foot bath : another will suggest a whisky hot, a third several whiskies ; still others will suggest a big dinner with a bottle of wine, rum and butter, rum and honey, oil of eucalyptus, camphor to snuff or to swallow ; a flannel shirt, a silk one, Jaeger or some other well-advertised clothing ; a fire in the bedroom, an extra blanket ; flannel round the throat, especially red flannel ; a prescription of some eminent physician given to some one for an ailment supposed to be similar to yours ; every recommendation certain to cure, and all different.

It is obvious that there is among our fellowmen a widely diffused accumulation of medical precepts, and a readiness at all times to place those precepts freely and unreservedly at the service of suffering neighbours. If we enquire into the source of this popular medical knowledge we shall find that much of it comes directly from the advertising columns of the newspapers, from placards in the streets and public places of our towns, and from the more recently introduced hoardings that beautify our landscapes and enliven our railway journeys, by all of which means the advertising quack seeks to introduce his pills, potions, and salves, to the notice of a confiding and all-devouring people. By such means and by the preservative influences of tradition and of effete medical works, traces of the medicine of every age, and remnants of every system of medicine that has ever been invented, have been handed down to us and have become part of the mental life of the nation.

To find the origin of these traces and remnants it is necessary to go back far, very far, in the history of the human race. Evidence has been found in various parts of the world that man existed away back at a time computed by eminent geologists to

amount to at least one million and possibly to more than five million years. The difference between these two calculations is considerable, but suppose those of us who are ordinary graduates and not geologists take the smaller figure and divide it by four, so as to allow for errors in calculation and observation, we still have a period of a quarter of a million of years, equal to more than 8,000 generations of men. Compared with this, the oldest civilisation of which we have any written or hieroglyphical remains is a thing of yesterday, a mere matter of 200 generations or so. And yet among the human relics of the almost inconceivably remote time of which geologists tell us, there are witnesses to the fact that medical knowledge had already advanced far beyond the primitive stage at which it is found among many of the savage races who exist on the earth to-day. Skulls have been found showing trephine holes that had been made during the life of the owner, possibly to give exit to the demons causing disease; possibly for some other reason which, if we knew, we might to-day consider rational. Other bones have been found showing fractures that had united, and still others showing the effects of rickets, syphilis, and other diseases. It may be observed that these early remains tell us of affections that belong to the domain of the surgeon; the physician is perhaps fortunate, in that the traces of his work are not so enduring; other sources of knowledge, however, tell us that the prototype of the physician is developed earlier than his surgical colleague, so that the suspicion lies near that the former may have instigated the making of the trephine holes.

While geologists thus afford us indisputable evidence of the immense antiquity of medicine, it is fortunate for the completeness and continuity of medical history that we have other and less fragmentary sources of knowledge. Such are the records of the nations who have successively attained the highest degrees of culture during the last 5,000 years or so that have elapsed since the days of the Chaldeans and Assyrians. But better even than from these we are able to trace the development of the science and art of medicine from observations on the different

racess of men that inhabit the globe to-day. Among these races are to be found examples of every stage of development from the earliest and simplest to the highest that has yet been attained, and by comparing the knowledge thus gained with that gleaned from history we are able to discern that medicine in its development passes through four more or less distinct stages.

The first of these stages may be called the period of Primitive or Natural Medicine, such as obtains before any special persons are differentiated into medical men. In the second, the medicine-man or fetish-server is supreme, and deals with evil spirits by means of magic, sorcery, witchcraft, and the like. The third stage is marked by the pre-eminence of the priest or philosopher, who is at the same time a physician. The fourth period begins with the separation of Medicine from other branches of learning, and especially from Theology; this may be called the period of Lay-Medicine, and its special characteristic consists in the unfettered development of the Science of Medicine, and the attempt to free its practice from the elements of mysticism and superstition.

As with the medical history of the race, so is it, speaking generally, with that of the nations. If we take our own country as an example, we find the same gradual evolution of Medicine. The Druids were the priest-physicians of the ancient Celts; later, the Romans brought with them a higher Medicine; but the separation of Medicine from Theology and other branches of culture did not begin till the 13th century, and Linacre, the first great English physician, was not born till 1460. In the last 400 years England has contributed her fair share to the development of the science and art of healing, and in the splendid work of the last 50 years has kept well in the van. And yet, if we look around us we see, side by side with a knowledge of Medicine that has never before been attained, traces of every stage that has been passed through in the development of that knowledge. Belief in the power of the evil eye still crops up from time to time; so also still persists faith in the royal touch, in charms and spells, in the healing powers of fasting spittle,

in never-failing specifics, in crude systems for the cure of all diseases, in earth cure, air cure, water cure, and so *ad infinitum*.

In some races, on the other hand, we are justified in inferring that no advance in Medicine, or in other branches of culture has taken place in thousands of years. In some of the old Egyptian hieroglyphics for instance representations are found of negroes, and indications that even in those early days there was commercial intercourse between them and the old Egyptians. And still to-day no negro race has developed a written or other language suitable for recording historical or other facts.

The first stage in the development of the art of healing, that of Primitive or Natural Medicine, may justly be inferred to have begun at the same time as, or very soon after, the appearance on the Earth of man himself. No long time would elapse before man found out, not only that certain plants and animals were good to eat and increased his sense of well-being, but also that certain others, and even the first class, if immoderately indulged in, were able to cause him grave inconvenience. A little further experience would teach him certain simple means of treating himself and of trying to hasten his recovery when sick. Experience would soon also teach him that his possessions and his life might be threatened by enemies, either among his own kind or among the lower animals, and it would follow by parity of reasoning that illness and death coming unexpectedly must arise from similar causes to his other misfortunes.

As an example of a people living at this lowest stage of culture the dwellers in New Guinea may be taken. Even in recent years travellers have reported that these people have no knowledge of metals, but are still in the stone age. They ascribe all diseases to the enmity of their fellowmen, not even supposing witchcraft. They seek to alleviate disease by offering gifts to some one of their tribesmen, who is supposed to be the cause of the complaint, and to be able to remove it. The sick man is simply allowed to do as he pleases; at the most he is visited by his friends and touched in proof of sympathy with his misfortune. With such ideas of the nature of disease no witch-

doctors are necessary; magic drugs and means are unknown, and there is not even the beginning of a medical profession. On the other hand, an iron-containing earth is eaten as a tonic, and especially as an aphrodisiac, to support the second great instinct that holds the world together; and woman stones are used to gain the love of women. The system of Medicine prevailing among these people is thus an empirical one, not yet mixed with the superstition that soon envelopes the art. From this earliest stage of development dates, in all probability, belief in the efficacy of the royal touch in curing certain diseases, as well as the theory of the "evil eye," faith in which is sedulously inculcated by the medicine-man who belongs to the next stage.

Such a state of primitive medical innocence as that just described, does not appear to persist long in the history of the progress of the human race, and I have not seen an account of any other tribe whose knowledge and methods have remained at such a low level. As experience increases, and unaccountable and unexpected disease or death overtakes man or his connections, his innate curiosity impels him to seek for a cause. And as the idea of total annihilation at death is repugnant to the human mind, so also speculation arises as to the future state. The surrounding parts of the earth, the hills, the valleys, the forests and the waters, become peopled with the shadows of departed fellow mortals. These shadows, ghosts, or spirits, are credited with the same powers as the individuals they represent possessed during life. Especially are they capable of injuring life, health, or property, and require to be overcome by force and cunning, or appeased by gifts and sacrifices. Of these two methods of bullying and propitiation, the former is the first to be tried. In order to deal successfully with the spirits, special knowledge is required, a special knowledge which is soon understood to be possessed by some one or more individuals in the tribe. Thus arises the Medicine-man, or Fetish-server, self-taught and self-appointed, who makes it his business to control the spirits and bend them to his purposes; and whose happiness it is to unite in his own person the powers and privileges not only

of a preventer and healer of disease, but of a magician, prophet, diviner, sorcerer, and what not.

The Medicine-man collects herbs and plants and portions of animals, studies their action on the human body, and lays the foundation of the art of pharmacy; but the salient point of his treatment has reference to the demons or spirits that give rise to disease. These he treats in a hostile and bullying manner; he frightens them with strange and terrible noises, disgusts them with queer and frowsy stinks, drives them off by threatenings, and invents amulets, fetishes, and the like, to keep them at a distance. Many of his remedies have been handed down to us; cow-dung is still applied to open wounds; only the other day a patient confided to me that she had been bathing her sore eyes with urine; and not so very many years ago I heard of the black-bile dodge—a dose of iron salt followed by a smart aperient—being practised with great success.

For a time the Medicine-man enjoys a considerable degree of power and influence, and reigns supreme in the domain of medicine. From him later the priests of the gods are evolved as a higher stage of development, and as they rise in the social scale gradually beat the Medicine-man at his own game, so that finally the latter sinks into obscurity, but unfortunately not into extinction. As we have seen the Medicine-man is self-appointed and self-taught; he knows no school and has no teacher but his own mother wit. His descendants are still to be found amongst us in no inconsiderable number, and many of his arts are no doubt as efficacious as ever they were. A graphic picture of the ways of a modern travelling Medicine-man who added to his other arts the wiles of a prophet and fortune-teller, is given by Marryat in "*Japhet in search of a father.*" The description there given would apply very well to a gipsy queen who was seen, or at least heard of, by most of us fifteen or sixteen years ago, when she was travelling the country selling nostrums for florins and drawing teeth for nothing. A brass band sat at the rear of her gilded car, and as the demons of tooth-ache were expelled, accompanied the joyful cries of the patients with the blare of

trumpets. The impudent charlatans of whom much has been heard lately under the guise of Christian Scientists, are the modern descendants of the Medicine-man masquerading in the lambs' skins of Priest-physicians, and forcibly remind one of the old saying that "the devil can quote Scripture to suit his purpose."

The third stage in the development of Medicine arises from the belief gradually arising, that if there are bad spirits to cause the diseases and other misfortunes of man, there must needs also be good ones to bring him help. Some of these good spirits have the power of preventing and of healing diseases, and so the priests, who are specially taught and consecrated to the service and propitiation of the gods, become called upon to act as healers of disease. The priest dwelt in temples to which the sick resorted for treatment, and some of which bore much resemblance to our modern hospitals.

This stage of Priest or Temple Medicine had already been attained by many of the older civilised peoples, as for instance, by the Greeks before the time of Hippocrates, and by the ancient Egyptians. From the last mentioned, the ancient Jews derived their knowledge, and that this was considerable is witnessed by the Old Testament. In Leviticus there are many instructions as to diet and hygiene in general ; as well as a very full description of the signs and symptoms of leprosy, with directions to the priests as to the methods to be employed in dealing with infected persons and houses ; and as to the rites and ceremonies that were to accompany the medical part of the treatment. In Deuteronomy, we have a denunciation of the second stage of medical development, that of the Medicine-man, including him "that useth divination, or an observer of times, or an enchanter, or a witch, or a charmer, or a consulter with familiar spirits, or a wizard, or a necromancer, for all these are an abomination to the Lord." From which it is apparent that specialism had already been pushed very far by the Medicine-man.

The medicine-man is a mere empiric ; the priest is already an

educated physician. In the temples were medical schools in which the pupils went through a certain definite course of instruction under teachers, and were formally dedicated to their calling. The priest-physicians amplified and corrected their knowledge by real medical observations, and from them eventually is developed lay or scientific Medicine. As long as it remained in the hands of the priests, however, medicine continued to be surrounded by mystery and superstition, and many of the methods of the medicine-man, altered or not by the priest-physicians to suit their own theories, remained in use.

From the two periods we have just been considering, many survivals have come down to us, and it is not always easy to say to which of the two any particular practice owes its origin. Speaking generally, as has been already hinted, the medicine-man employed methods to frighten and drive off evil spirits, and the priest-physician used similar means to appease and propitiate good ones.

Among these survivals may first be mentioned the practice of charms, spells, and enchantments, a belief in which still persists to a greater or less extent in the midst of the most civilised nations. A curious charm is said still to be practised in Devonshire for the complaint called white swelling. Bandages are tied round the afflicted limb, over which the following charm is then repeated nine times, followed each time by the Lord's prayer.—“As Christ was walking, He saw the Virgin Mary sitting on a cold marble stone. He said unto her, ‘If it is a white ill thing, or a red ill thing, or a black ill thing, or a sticking, crackling, pricking, stabbing, bone ill thing, or a sore ill thing, or a swelling ill thing, or a rotten ill thing, or a cold creeping ill thing, or a smarting ill thing, let it fall from thee to the earth in My name, and the name of the Father, Son, and Holy Ghost.’” The reason for so comprehensive a charm being limited in its application to the treatment of white swelling is not apparent. For curing warts the charms are many and varied; one that is still practised is to “steal a piece of beef from a butcher's shop and rub your warts with it; then throw it down the ‘necessary



house,' or bury it; and as the beef rots your warts will decay." In my own early youth I well remember having sties charmed away from my eyelids, by having them rubbed with a gold wedding ring. The very hieroglyphic with which the physician even now starts his prescriptions is a sign that originally meant an invocation to Jupiter.

The words incantation and charm seem to have been derived from the ancient practice of treating disease by poetry and music, with the idea either of driving out or of propitiating the spirits which caused the affection. Long years ago we are told that David played the harp before Saul, and the evil spirit departed from him. Galen believed the sound of the flute efficacious in gout and epilepsy; Asclepiades employed the trumpet for the relief of sciatica, and tells us the treatment is to be continued until the fibres of the part begin to palpitate, when the pain will vanish; truly an heroic remedy! Among the Burmese, even in recent years, "when a man is hopelessly diseased, the physician in attendance recommends music as a tonic, which is usually played all night—a jumble of a pibroch and something else very badly played—and the patient has frequently the satisfaction of seeing his own coffin, beautifully ornamented and placed opposite to his house for inspection, and can listen to the strains of music which are to transport his soul into the state of happiness." In striking contrast to the soothing effect which this music no doubt has on the distracted Burmese soul, may be noted the irritative disorders of mind and temper frequently produced by the common or street barrel-organ.

To the times of the medicine-man and the priest-physician also belongs the belief in the peculiar efficacy of redness in flannel for sore-throat, rheumatism, and swellings. The cloth often used in incantations was red; among the Marutse Zulus now the medicine-man bears the red faculty colour; among ourselves the M.D. in full fig wears a scarlet gown; in the Guianas there is only one medicine-man in each tribe, but he makes up for his paucity in numbers by painting his whole body red, and by wearing

three high feathers on his head, and a kind of wing upon his shoulder.

The doctrine of signatures is also of very great antiquity; it implies that every substance that possesses any medicinal virtue shows by some obvious and well-marked external character the disease for which it is a remedy. Thus the blood-stone was efficacious in bleeding, turmeric in jaundice, and poppies for diseases of the head. The leaf of the castor-oil plant worn round the neck was able to ward off devils, because the leaf is like the open hand. Another very ancient belief analogous to those just mentioned is that like cures like; "a hair of the dog that bit him" was a charm to prevent hydrophobia; the foot of the ape was a remedy for the bite of the animal; and three scruples of the ashes of a witch that had been well and carefully burnt at the stake was a sure preventive of the evil effects of witchcraft.

Amulets were among the earliest agencies employed in the treatment of disease. Their origin is lost in antiquity, but they were used already by the Assyrians, Egyptians, Persians, and Jews, hundreds of years before the Christian era. First used by the medicine-man to ward off evil spirits, they later were adopted by the priest-physicians and caused to be worn with the idea of propitiating good spirits, and all down the centuries much faith has been reposed in them. Amulets were made of stones, metals, simples, animals, and generally of anything in the world. On them were written characters, figures, or words, which had to be arranged in a certain order; a well-known one was the word ABRACADABRA written on paper and worn suspended from the neck by a linen thread. Another favourite inscription, ABRAXAS, was supposed to ward off fevers and pestilences. Sometimes nothing was written on them, but they were prepared and applied with many superstitious ceremonies; one variety, to which the Arabs gave the name talisman, depended principally on the influence of the heavenly bodies, and great care was required to make sure that the stars were disposed favourably during its preparation. Amulets were made of all forms, and

attached to all parts of the body. Some resembled a piece of money pierced with a hole so as to be hung to the neck with a thread ; these recall to mind the lucky coins common among us to-day, sixpences with holes in them, and two-headed half-pennies reputed lucky for tossing with. Other amulets were made in the form of rings, still others as bracelets or collars. The wedding ring is an amulet made of precious metal, and it is worn on the third finger, which was the medicine finger of the alchemists. When the fond young couple encircle the neck of their first-born with a string of corals, which they fervently hope may never be removed, they are helping more or less consciously to perpetuate a belief in the efficacy of amulets that is nearly as old as man himself. Many mystic properties were attributed to corals, which were believed to ward off the evil eye, and to drive away devils and evil spirits. The bells often suspended to the infant's neck along with the coral were originally intended, not to amuse the child, but to drive away evil spirits. The lump of camphor in a silk bag hung from the neck to ward off contagion during epidemics ; the piece of worsted worn round the wrist to prevent or remedy sprains ; the piece of blue ribbon worn by many people to keep off bad spirits, and by some to attract good ones ; these are all examples of amulets in use among ourselves at the present day, or at any rate till very recently. Similar in origin are also bracelets and bangles, anklets and ear-rings, made of metals and more or less precious stones ; and the nose-rings sometimes worn among races that are rather less civilised than we are. A very desirable amulet is described by an old writer as "a stone of the bigness of a bean, to be found in the gizzard of an old cock, which makes him that wears it beloved, constant, bold, and valiant in fighting and sports."

Of the materials from which the most desirable modern descendants of the amulet are made, precious stones were introduced by the Arabs, who supposed them to be the residence of spirits ; they were at first worn as amulets, but afterwards came to be administered internally for various ailments. Metals

were also supposed to be the abode of certain properties ; thus gold was understood to strengthen the heart and drive away melancholy ; silver possessed the same properties, but in a less degree. Needless to remark, these properties are as firmly believed in by us to-day as they were by the Arabs who first discovered them.

The fourth stage in the history of Medicine is marked by the separation of the art from Philosophy and Theology, and its constitution as a distinct branch of learning. This differentiation dates from the fifth century before Christ, and originated in Greece when she was at the height of her glory, and when within the short span of a single century there was produced, in the little Attic peninsula, the most wonderful array the world has ever seen of men eminent in every branch of learning and practice. Time is too short for more than a mere cursory glance at a few of the names that adorn this epoch in the world's development. Then lived statesmen and generals like Miltiades, Pausanias, and Aristides, Themistocles, Pericles, and Alcibiades. Phidias created his statue of Zeus and built the Parthenon ; Praxiteles carved his Venus ; Polygnotus, Zeuxis, and Parrhasius gained undying fame as painters. Rhetoric was brought to perfection by Isocrates, Æschines, and Demosthenes. As philosophers flourished Empedocles, Anaxagoras, Democritus, Socrates, Plato, and Aristotle. Historians were produced like Herodotus, Thucydides, and Xenophon, and poets and dramatists like Anacreon, Pindar, Æschylus, Sophocles, and Euripides. It was at this period favoured of the gods that on the small island of Cos, in the year 460 B.C., was born Hippocrates, to whom Medicine owes her initiation as an independent branch of learning. Hitherto the practice of medicine has been in the hands of priests and pundits ; now it is pursued by a special body of men who devote themselves to it entirely.

The method of Hippocrates, Rational, Dogmatic, or Scientific Medicine, is based entirely on careful and patient observation of facts that admit of being discerned by our senses, and it is on

these lines that all true progress in Medicine has taken place since his time. For many hundreds of years after Hippocrates progress was hindered by blind reliance on the infallibility of authorities. The latter half of the present century has seen the emancipation of the workers from this incubus, this old man of the sea that so long spoilt the efforts of their predecessors, and as a result, Medicine has developed at a rate and to an extent never surpassed in the history of mankind.

The system of Medicine thus inaugurated by Hippocrates, though sure, is a laborious one, and man has never ceased to look for some shorter and easier method of healing. The two chief competing systems in the early days were the Empiric and the Methodic. The Empirics seemed to have flourished as a distinct sect from about the fourth century before to the fourth century after the birth of Christ, and they affected to follow only what they were pleased to term experience, without bothering themselves about the causes of disease or the mode of action of remedies. This mere surface of experience forms to this day the chief stock-in-trade of the unqualified medical practitioner and "stickit" medico. The Methodics introduced philosophy once more into Medicine; their patients were told only of pores and atoms, of little bodies of different sizes, of passages choked or constricted, of passages too open or relaxed. One of this sect, Themison, who lived under Augustus a little before the birth of Christ, undertook to render the system still more simple; he retained only that portion of the system which concerned the opening or closing of the pores. According to him illnesses were of two kinds only, the constricted and the relaxed; hence, only two classes of remedies were required, one to relax and one to constrict the passages, and there was no need to trouble about the nature or the causes of the two conditions. This system reminds me of an old hospital physician of whom I heard a few years ago, who had earned for himself the title of "old open and shut"; on one day as this gentleman went round his wards aperient medicines would be ordered for the patients, and on the next

the result of this set of prescriptions would be met by diarrhoea medicines, and so on.

There has always been a demand for some simple system of Medicine comparable to that of Themison, and recent examples easily come to mind. A short time ago there died the reverend German Father Kneipp, who was famous for a system of treatment that rigidly enforced the law of the survival of the fittest. All sorts of patients suffering from all sorts of ailments were put on the same Spartan regimen, which included a certain amount of exercise in the open air ; in all kinds of weather this exercise had to be taken by the patients with bare legs and arms, and a generally insufficient amount of clothing. The treatment being the same in all cases, one is not surprised to learn that the patients could be seen and prescribed for by the reverend gentleman at about the same rate as that at which an ordinary person would view a circus procession. Another reverend German was recently building a Sanatorium in a village near the Rhine for the treatment of the sick by an even more remarkable method, which is known as the "Earth Cure." Man, it is argued, being made of earth, as the Bible teaches, must by earth be cured of disease ; and so the patients are made to wallow in loamy earth, to lie face downwards with their noses stuck into holes in the ground, to wander about stark naked during the day, and at night to sleep on the bare earth. By these means every complaint, external and internal, is treated, so that the patient may gain the full advantage of "the currents of earth magnetism."

Kakoethes Medendi as an essential constituent of human nature, a part of original sin if you will, is responsible for all these things ; for the highest development of medical science as for all the strange things that are done in the name of Medicine. And the reason is not far to seek ; the patient and the physician look upon disease from two entirely different points of view. When the man in the street is in robust health he delights to chaff the physician with pouring drugs of which he knows little into bodies of which he knows less. When he is a little out of

sorts, the man in the street does not hesitate to try on his own body the experiments he accuses the physician of trying on the bodies of others. But when he considers himself to be seriously ill, the man in the street—and the doctor when ill is in no way different—demands for his complaint an instant name and a cure. It avails nothing for the physician to urge that if he will only wait a little, rest, and lead a sensible life, nature will set him right *cito, tuto, et jucunde*. A cure he wants, and a cure he will have. "The physician," says Miss Fowler in "Isabel Carnegie," "who diagnoses any complaint without suggesting a remedy, may be an able scientist, but he is a sorry doctor."

So the man in the street continues to busy himself with all sorts of medical sayings and traditions, and to run after every new or reputed to be new thing that is recommended for the treatment of disease. And so traces and remnants of every stage in the development of Medicine continue and will continue to crop up. It is the same in other branches of culture. Take for instance Art; side by side with the achievements of the greatest living painters persist the art of the street pavement and that of the *Police News*; and even that of contemporary notables who with closed eyes make pigs by one stroke of the pencil.

So will it always continue to be. The lesson that there is no short cut, no royal road to knowledge, is a hard one for poor human nature, idle though curious, to grasp. Gradually as the years roll on those who devote their lives and all their energies to Medicine are enabled by plodding perseverance, by the patient accumulation of facts, and by arranging, re-arranging, and pondering on these facts, to form bridges to carry their knowledge from the known ever more into the unknown but possible to be known. It is true there have been periods of vast intellectual activity and more rapid progress, such as the flourishing Grecian epoch, the Renaissance, and the latter half of the century now rapidly drawing to a close. True too that once in a way men like Harvey and Lister, to name only countrymen of our own, arise to illuminate by their genius tracts

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of knowledge that have before been but dimly perceived "as through a glass, darkly." But the broad truth remains that medical like all true knowledge is attained only by slow and painful steps. Medicine is not evolved from the inner consciousness of men, but is the daughter of Time.

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## MEDICAL BOOK-KEEPING WITHOUT BOOKS.

### THE CARD SYSTEM.\*

BY THOS. NELSON, M.D.

TOWARDS the end of every quarter or half-year one hears from all quarters much grumbling at the tedium of ledger posting and bill making. No one with a large practice can, under any circumstances, contemplate with equanimity this necessary inconvenience and great trial of patience unless extraordinarily blessed with a docile, obedient, self-sacrificing and intelligent assistant of some sort, who is capable of lifting this heavy load from the shoulders of the practitioner. Whether there is one large—often very large—ledger, or several smaller ones, makes very little difference. To snatch half-an-hour or more for booking means, first clearing away every day papers, books, etc., from the table, and getting out the ledger or ledgers. Very often, just as a start has been made, one is interrupted by the arrival of a patient or an urgent message and everything has to be put away again without anything being done. If by good fortune, on the next attempt, time is obtained for this purpose, one plods on, looking up an index for every name in the visiting list, not quite sure what ledger the name is in sometimes, turning over sheaves of leaves and entering laboriously the various items, writing fresh names and addresses on fresh pages of the ledger and indexing them. This process has to be gone through from week to week,

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or month to month, as the case may be, and afterwards perhaps a prescription book or day book, according to the system in use, requires to be posted.

It is impossible to describe all the various systems of book-keeping adopted by medical men. So far as I have seen they all involve troubles, more or less of the kind mentioned. When all this has been completed, the bills have to be written out. Whilst thus engaged, pages upon pages of the ledger have to be turned over containing accounts, some paid and done with long ago, but none the less requiring a momentary scrutiny, some owing for a very long time, and provocative of maledictions, some in the hands of the collector who very often receives his share of disrespect, and some that are past praying for by reason of the hopeless insolvency, from whatever cause, of the debtor. All these receiving a varying amount of attention, absorb time unnecessarily, and materially hinder the prompt delivery of accounts to those who, in the honesty of their purposes, are only too glad to discharge their just debts. The task having been accomplished, the books are put away with a great sigh of relief, and the day of reckoning awaited with exhilarating expectations.

When an account is paid the ledger must be produced afresh, again disturbing papers, books, etc., the name in the index found, the folio turned up, and the golden pot of ointment is at least slightly fly-blown by the trouble of the entry. Again, the collector calls with his few shillings or pounds, spread over several dozen names. The ledger again! a painful hunt through its index and pages, the tiny entries made, and when all is over the debts are not yet liquidated, but only barely thawed. Anything like a knowledge of the state of affairs as regards bad debts, doubtful debts, and good accounts, is only possible by keeping another book into which fresh entries have to be laboriously made. Thus is valuable time, and still more, valuable peace of mind rudely wasted, and the business part of our lives rendered a labour and a sorrow.

My attention was first directed to the card system of book-keeping by a scientific friend who had suffered long and

patiently from much grumbling on my part at the troubles above detailed. The system is of American origin, and is now being exploited by the Library Bureau, 10, Bloomsbury Street, London, W.C. It is adaptable to many purposes, *e.g.*, cataloguing libraries, registering Insurance business, indexing correspondence, etc. It has been and is used in America, and to a certain extent in this country by many doctors, both for hospital and private work; and the special requirements of special conditions and circumstances are provided for by specially printed cards which, being made to order, allow of details being entered with the least possible trouble and yet in the clearest and most easily found manner. I am informed by my friend above mentioned that at the works of which he is proprietor more than 20,000 of these cards are in daily use, and that he used an equally large number in a scientific enquiry which without their aid would have been wholly impossible.

With the assistance of this gentleman, and to whose kindness and patience I shall ever remain a debtor, I applied the card system to the details of my practice. It is needless to go into the various developments through which the idea has passed. It may however suffice to say that through considerable trouble and patience in adapting the system a great saving in time and labour has been accomplished, and that already "booking" time and bill time have no terrors; mistakes are almost impossible, and all that is now required to make it absolutely ideal, is that payments should flow in as easily and as quickly as accounts can be rendered and cases referred to.

The cards used are of thin cardboard, 3 ins. by 5 ins. in size and are plain ruled. They can be had in different colours. Thus, I use a white card for ordinary work, a blue card for midwifery cases, and a salmon coloured card for appointment work, *e.g.* Post Office employees. One separate card is used for each case whether it be seen in consultation at chambers or visited at home. The name and address of the patient, on the receipt of a message for home attendance, or on his coming to the consulting room, is written on the top line of a card. If he

is to be visited at home the card is placed in the tray set apart for the "visiting list." This is an ordinary shallow sorting tray made by the Library bureau, measuring  $8\frac{1}{2}$  ins. by  $5\frac{1}{2}$  ins. by 2 ins., and divided into five compartments. A series of 31 division cards called Day Guides, having on their upper edge a tab, and on each tab a number running from 1 to 31, represent the days of the month. In the second of the five compartments of the tray lie the cards of those to be visited to-morrow and the next day, behind their respective day guides. In the third division, similarly arranged, are the cards for the next few days. In the fourth division lie the day guides not required, awaiting the return of their usefulness. As each day passes the day guide for the day gone is placed in this compartment. The fifth division is reserved for the cards of those who have just ceased to require visits. These can be disposed of at the end of the week or month as preferred into the alphabetically arranged series about to be described. It will be observed that by this method only live cards or cases actually requiring visiting catch the eye instead of being compelled to pick out and write down afresh from a long mixed column of running and finished cases the list for the day.

On starting out in the morning, the cards for the day, are arranged in the proper order for the round and placed in an ordinary folding pocket-letter case. At the patient's bedside notes can be entered, such as the date of the visit, special symptoms, the prescription—all in abbreviated terms—and the date of the next visit promised. The card is then transferred to the vacant side of the letter case, and so on till the list is completed. On returning home, any detail requiring attention can be at once seen to and not forgotten, and the card placed behind the date (day guide) for the next visit. If any detail is not completely attended to for any reason, the card is placed in the first division of the tray, where the fact of its presence there is enough to ensure that it will not be forgotten, but attended to before the day is out. It then goes to its place. When a card is full, which may take weeks or months, a second card is begun and is

readily distinguished as such by clipping off a small corner. The name of the patient must of course be written on the fresh card, and it can be numbered 2, 3, or 4, according to the number of cards used. Thus, writing a patient's name and address *once* is all that is required, for perhaps months or it may be years of attendance.

The cards used for patients attending at chambers are marked in the same way as to details. They are however arranged alphabetically as are the words in a dictionary, letter guides being inserted. These are similar tab cards to the day guides, only having letters from "A" to "Z" instead of a number. The cards from the visiting list which are done with for the time being are distributed in this bundle, and thus at the end of each quarter there is only an alphabetically arranged bundle of cards to be booked up. Thus the cards become a complete record of our cases with notes made at the bedside. Being arranged in strict alphabetical order any case can be found at once and histories of illnesses brought back to mind in a manner practically impossible by any other method with which I am acquainted. The importance and advantage of being able to do this requires no more than mention.

It is possible and quite practicable to make these cards also ledger cards—that is, when an attendance is finished the amount chargeable can be written in red ink across the card, and the bill sent out from this entry. I have, however, for the present at least, found it more workable to have special ledger cards. They are the same size as the others, are of a different colour, and are ruled with money columns, two money columns being on each side of the card. Each side of the card allows of 30 separate entries being made, or 60 in all.

On commencing the system it is necessary to transfer the contents of the ledgers hitherto used to these cards—a separate card for each account. It suffices to put down the amount owing with the date of the rendering of the last account, and a reference number to the folio of the ledger from which the account has been taken. It must be done completely and

thoroughly, every penny unpaid must be accounted for on the cards, whether likely to be paid or not. The cards are then arranged alphabetically as were the case cards, and letter guides inserted as before. It is astonishing to find how small a space is occupied by the whole bundle of accounts. I found it to be less than a sixth of the bulk of my former books.

The cards are best divided at once into two series: 1st, those doubtful and in the collector's hands; 2nd, those good but unpaid. A third bundle will gradually grow, namely, those paid and done with. These need not attract any attention, but are best kept for future reference. All three bundles require for themselves a separate set of letter guides.

To "book" up from an alphabetically arranged series of case cards to a similarly arranged series of ledger cards is so easy and expeditious, involving as it does, no disturbance of any kind, that I cannot conceive of a better method. The cards under one letter can be done at a time in a few spare minutes, and if interrupted, everything can be out of sight, if desired, in a couple of seconds. The booking being accomplished, the bills are written out, one after the other, from the bundle of ledger cards—only unpaid accounts catching the eye.

When an account is paid, the ledger card is found at once, marked paid and transferred to the paid bundle. The index and the account are one, and less than a third of the time required to post up the paid account in a ledger suffices.

When a collector comes, the names of those who have paid him small or large sums are found at once in the special bundle set apart for this purpose. As soon almost as he can call out the names, the amounts are entered and the cards returned to their places. Enquiries can at the same time be made about other accounts in his hands, and the whole transaction completed so quickly that there is neither time nor opportunity for anything but business.

In contrasting the two systems, we find in the first or ledger system, big books occupying much space and costing much money; an index entry and a folio entry necessitating unnecessary

labour in reference; much turning over of leaves and consideration of accounts either paid or bad before the good ones are dealt with; much time wasted looking up indexes and finding individual accounts; unnecessary trouble in finding accounts that are being paid either in whole or in part, and a great deal of trouble to find out the proportion of good, bad, and indifferent accounts; many repeated entries of names in the visiting list, either weekly or monthly; many terminated cases catching the eye when picking out the day's work; and many laborious references to the ledgers for booking purposes.

In the Card System the folio and index pages are combined in one and one only. The cards are found easily in their proper places without having to look up an index. One tray or bundle contains only accounts to be written out one after the other, thus reducing very greatly the time necessary for the purpose. There are no paid accounts to catch the eye. All bad or cancelled accounts and accounts in the collector's hands give no trouble here, occupying as they do a Gehenna of their own. Any time from five minutes up to as many hours, if necessary, can be spent in booking without any disturbance to surrounding objects, and the time taken both in booking and sending out accounts is reduced so materially as to be the greatest comfort of all. In my own case I did my Xmas work in less than half the usual time formerly required for this purpose. Lastly, nothing is overlooked. Each card is exactly the same size as its neighbour and it does not matter whether the account has been there one month or five years, it is in its place and receives its attention in due time, good accounts first, collector's accounts next, and paid accounts become only part of the Nirvana of our pockets.

In this system booking is reduced to its least possible dimensions as regards time and trouble. Names have not to be continually repeated as in the visiting list, but only when a card is full, which may take months or years to accomplish.

It has been argued as a serious objection to this system that the card may get lost. Such a circumstance can only be possible

as the result of the most gross carelessness. I am informed by my friend, that although so large a number as 20,000 have for some years been in daily use in his offices, and handled by various employees, there has not yet been one single instance of a lost card. To guard against such a possibility, cards are made with a round hole punched at the bottom through which a metal guard-rod can be passed, this being fixed in the special tray or drawer in a small cabinet made by the above-mentioned firm. By this means the cards can be turned over for inspection, but none removed till the rod is pulled out. These special cases are very elegant and highly finished cabinets, of varying sizes, containing from one up to several drawers and look well on a consulting room table.

The personal comfort derived from this system has prompted me to bring it forward in the hope that by its means, time, temper, and trial may be saved by all who adopt it.

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## OUR TOWN COW-BYRES, AND THEIR INFLUENCE ON THE NUMBER AND VARIETY OF BACTERIA AS DELIVERED TO CONSUMERS.

BY DR. BERTRAM ADDENBROOKE.

"It is difficult not to feel convinced that infection of the milk outside the udder and the conditions under which it is kept are the most important factors, causing it at times to acquire pathogenic properties."

What are these conditions? Whilst investigating the surroundings of numerous cow-byres, several matters struck me as being great predisposing causes to the occurrence of enormous numbers of bacteria in the milk obtained from the cows in these byres.

Firstly: In nearly all, if not quite all the town byres I have seen—and they are many, at one time and another—I was much impressed with the number of cows crowded into a very

small space. So narrow are the individual stalls in many byres that the hind legs of one cow lying down must of necessity touch the legs or body of the next cow, if it also be lying down; and it is no exaggeration to state that when the stalls are on either side of the byre, there is barely room to pass down the middle of the byre between the two rows of animals.

The byres are very dark: in many cases there is either a very small window or none at all; a door at one, or perchance both ends of the byre, one or both of which are generally closed through the larger part of the twenty-four hours. On enquiry, and remarking that the shed has a very stuffy, warm, close smell, and that there seems to be very little light, and less fresh air, one is almost invariably met with the rejoinder, "Oh! the cows need to be kept warm."

So here, to begin with, are many favourable conditions for the growth and multiplication of bacteria:

1. Absence of sunlight, direct or indirect.
2. Stagnant air full of organic exhalations from the cow.
3. Warmth and moisture.

Secondly: On looking at the individual stalls one finds that on the floor there is either absolutely no bedding, or else (what in my opinion is more efficient as regards the distribution of bacteria in milk, etc.) that the stalls are bedded down with peat moss litter, or, more efficient even than peat moss litter, "pine sawdust"; the result being that owing to the movements, the occasional snortings of the animals, and currents of air, fine particles of dust from the litter and sawdust are disseminated in the air of the byre; on these bacteria settle, and when the cows are milked these minute laden particles of dust and litter drop into the milk. That these particles of dust are very important agents in infecting the milk may be fairly assumed; I think, from the similar occurrence when milk turns sour after a thunder-storm, through the electricity in the atmosphere causing the moisture present in the air to conglomerate into minute droplets upon which the bacterium lactis amongst others settle, and then these laden droplets fall into the milk.



Thirdly : Here we have crowded byres, organic matter continually given off by its inmates, and yet the cattle are housed in these places night and day, never leaving the stalls, even for five minutes, for months at a stretch. Can it be wondered at that the milk oftentimes is poor in quality ; and with the concomitant items of insufficient lighting, inefficient ventilation and deficient bedding, that the milk is crowded with bacteria, which latter cannot but have an injurious effect on the milk, and hence on its consumers.

Fourthly : One finds the manure pit necessarily, in many instances, owing to want of space, in very close proximity to the cow-byres ; in one case the manure pit was within five feet of the byre. In many instances also there is no covering of any description to the manure pit ; winds as a result blow and carry particles of dust and bacteria about, helping to swell the numbers, already terrific, in the milk sold in our large towns.

Fifthly : There is another, though perhaps a minor point, as regards this investigation, and it is this : the milk obtained from the cows inhabiting these byres is generally used for immediate consumption only (not utilised for making butter, etc.), so that many of the tenants have no dairies or proper place to keep the milk-cans ; the result being that when the milk-cans are empty and are washed, they are placed outside the back door near the byre to dry ; and also after the first can is filled, it stands either inside or just outside the byre, a most favourable condition for further contamination.

In this small investigation I have had in view and for object the ascertaining of how much contamination by bacteria takes place extraneous to the cow, so have not sought for the bacillus tuberculosis, which may, or may not, have been present in some of the samples.

Appended are the results of the bacterial analysis of six samples of milk obtained from town cow-byres, two samples of milk from country farms, and a third sample taken from a town stall-fed cow, but which was—unknown to me at the time—

milked directly into the sterile test-tube. Below I shall shortly describe my method of procedure.

Before each sample of milk was subjected to the examination described below, all the apparatus used, such as pipette, plates, etc., were thoroughly sterilised, and the gelatin plates were made when I was alone in the laboratory, for obvious reasons.

The samples were obtained in the following manner:—A sterile test-tube was taken to a cow-byre, and as the milk was leaving in the cart to be delivered to the consumers, with the measure from the milk-can some milk was transferred to the sterile test-tube, the cotton-wool plug of which was immediately replaced. In the case of the two samples of country milk the milk was not obtained under quite such favourable conditions, as I obtained it as it was being delivered to the consumers.

Within the hour after collecting the sample I made gelatin plates, using .25 cc. of milk as the quantity in every case, having previously thoroughly mixed the milk by shaking it. Each individual plate was then placed for three days at the laboratory room temperature, and left to incubate for three days. At the same time I dropped .25 cc. of the milk on the two halves of a split potato, and placed it under similar conditions for from three to five days.

At the end of three days, with the aid of a small hand lens, I counted the colonies in the gelatin plate; then by placing the gelatin plate under low power of microscope, from the colonies that in any way differed from one another I made sub-cultures in gelatin tubes, and placed them in the cool incubator for three days.

From the colonies on the potato, from any varieties that could be distinguished, I made gelatin plates, then, after three days, gelatin stab cultures as in the other case.

From the gelatin stick cultures, sub cultures were made on agar slope tubes; these were placed in the warm incubator and left for one, two, or three days. From each of these sub-cultures microscopical specimens were made.

So, as will readily be seen, the .25 c.c. of milk was in each

case subjected to examination under as favourable, if not more favourable conditions, than it would be in when it reached the consumer, after all the important practical point.

The number of colonies, and hence bacteria, in each cubic centimetre of the milk obtained from the six town cow-byres was as follows :—1,300, 3,260, 1,720, 436, 6,000, and 1,080 respectively, roughly about 6 c.m. to 1 cubic inch.

I also made gelatin plates in a similar manner with two other samples, but the number of bacteria seemed so excessive that, thinking there must have been some undetected accidental contamination, I destroyed them ; however, since then, having seen the results of some observers, and finding that they give far larger numbers (60,000 in one instance), I think that they may be given as reliable figures, namely : 13,320 and 9,200 respectively in one cubic centimetre of milk.

It will be interesting here to give the results of some observers.

Dr. Sheridan Delépine, in his paper "The Examination of Cows' Milk for the detection of Pathogenic Properties," gives the figures of nine samples of milk he examined, which samples he places under the heading, "Samples taken in byres where conditions were less favourable" (referring here to samples taken at the end of a winter and under favourable conditions), the numbers vary from a maximum of 21,700 per cubic centimetre to a minimum of 830 per cubic centimetre, and this half-an-hour after milking.

Other observers, such as Cropf and Escherich of Munich, have given much higher figures, amounting to as many as 60,000 bacteria to one cubic centimetre.

In the two samples of milk obtained from country farms, I found 92 and 156 bacteria respectively in each cubic centimetre of milk. Whilst in the sample milked straight into the tube, there were 35 bacteria only to each cubic centimetre of milk. These two samples of country milk show a marked difference in the number of bacteria present.

So, here we have, in the winter months, milk sent out for human consumption, teeming with bacteria which, though the

majority may in themselves be non-pathogenic, cannot but have an injurious effect on the milk, either by turning it acid or producing fermentation or toxins; and there is considerable evidence to show that at all events many of the bacterially infected milks when injected subcutaneously or intraperitoneally in a guinea-pig produce pathogenic effects.

For facts, I must again quote from Dr. Sheridan Delépine's article:—Of some 93 samples examined by him and injected into animals (guinea-pigs) 32 had no appreciable effect on the animal beyond a slight local effect; 61 had distinctly pathogenic effects producing intense irritation; in fifteen of these latter general infection took place; whilst in 31 cases death ensued (tuberculosis samples are excluded in this series).

In another series of cases, in the lesions produced by injecting the milk subcutaneously, in 16 out of 26 cases either bacilli or cocci or both were found, producing marked irritation, etc.

Again, Analytical Chemistry books and others state, and it is generally believed, that fresh milk should be faintly alkaline, and yet the only sample I found alkaline was the one obtained by milking the cow straight into the test-tube. Of the others, the two country milk samples and the two better town byre samples were amphoteric, whilst the remaining four samples were acid in reaction.

In some 67 samples examined by Dr. Delépine:—15 were alkaline; 43 were amphoteric; 9 were distinctly acid.

Some of the fine cultures of the bacilli inoculated in sterile milk, and placed in the warm incubator turned the milk distinctly acid; this will be mentioned again in describing the bacteria.

One may, I think, fairly assume that the greater part of the milk obtained from these town cow-byres is supplied to consumers living in the town, and chiefly to the poorer class of people, and one finds that epidemic diarrhoea is very much more prevalent in towns, cent. per cent., than in country districts, and is practically confined to the poorer class, who chiefly are supplied with this inferior milk; surely one may not unreasonably

suspect that this bacterially contaminated milk, as being a much more likely cause than the water supply, or the height of the four foot earth thermometer; for it is the infants and children of our towns that are supplied with this milk, and so many of the former are hand reared.

The water supplies of towns are undoubtedly on the whole infinitely better than those of country districts, and it is in the latter that one would expect the heat of the ground to show its effects rather than the former. Here may well be quoted the following paragraph out of Sheridan Delépine's article:—

“With regard to outbreaks of Epidemic Diarrhoea due to the consumption of milk, I have found a close resemblance between the infection which I have produced in guinea-pigs by the introduction of milk which had given rise to one of these outbreaks and that produced in guinea-pigs by the injection of several samples of mixed milks obtained on the market. This has led me to suspect that milk must be one of the most potent causes of the summer diarrhoea of children.

“From all the cases of fatal septicæmia due to milk injections, I have been able to isolate a bacillus identical with that which I have obtained twice, from milk causing intense diarrhoea in children and a few adults.”

Having demonstrated the enormous number of bacteria present in milk from such sources, and having endeavoured to point out their probable deleterious effects, if the supply of milk from these sources must continue, the question arises, how are these bacteria to be destroyed without spoiling the milk.

I found that by placing some milk in a test-tube, and the test-tube in cold water, and raising the latter to the boiling point, directly this temperature has been reached the bacteria are all destroyed, as shown by negative results on gelatin plates; or else by keeping the milk under similar conditions for  $3\frac{1}{2}$  minutes at  $85^{\circ}\text{C}$ ., the same result will be obtained. In neither of these cases does the milk itself reach its boiling point, nor do the characteristic changes take place making what is known as boiled milk; though it must be stated that some change unfortunately

does take place, which can be detected, but it is very slight; though surely this is infinitely better than allowing milk to be consumed which may have serious pathogenic effects, apart altogether from the very serious risk of tubercular infection.

Appended are the chief varieties of bacteria which, by their microscopic appearances and cultures on various media, appear to be distinct one from another.

The specimens in test-tubes submitted of some of the cultures on agar and gelatin were preserved in formalin, which unfortunately in two or three instances seemed to entirely spoil the specimen. The ends of the tubes were then closed with sealing-wax, and the india-rubber cap replaced.

I had hoped, by aid of Eisenberg's Bacterial diagnosis and other books, to have named many of the bacteria, but in these lesser investigated bacteria, comparatively speaking, so few points are given of their culture characteristics that I have been unable to do more than hazard the names of three:—

Bacillus A possibly may be *Bacillus Lacticus*.

*Streptococcus D*, *Streptococcus Candicans*.

Bacillus C, the liquefying bacillus.

Instead of christening these bacteria with new names, I have divided them into four classes:—Micrococci, Streptococci, Staphylococci, Bacilli; and the varieties of each simply designated alphabetically (A, B, etc.).

It will not be of much interest to you for me to describe all these bacteria in detail, their culture characteristics, etc., and I will only ask you to draw your own inferences from what I have pointed out, as to the desirability of these institutions in towns, and to the effect they are having on the health and mortality of our infant population.

**MICROCOCCLUS A.**—Large micrococci, staining with simple stains well, and also retaining the stain in Gram's method.

**Gelatin plate culture.**—In three days' time, at room temperature, small brown circumscribed colonies may be observed, with ill-defined margins.

**Gelatin stab culture.**—On the surface, in three days' time, there

is a plentiful growth, whilst along the puncture small discrete colonies form. Does not liquefy the gelatin.

*Agar slope tube.*—In twenty-four hours, there is an enormous growth, dry in appearance, having at the edges a somewhat fern-like character.

*Micrococcus B.*—A micrococcus rather larger than Micrococcus A, stains well with the ordinary basic stains, retains the stain in Gram's method.

*Gelatin plate culture.*—Small circular greyish white colonies just visible to the naked eye in three days' time.

*Gelatin stab culture.*—White growth on the surface of the gelatin, along the needle track small somewhat oblong white colonies are formed. Does not liquefy the gelatin.

*Agar slope tube.*—White heaped up growth, glistening and moist in appearance, where growth is less profuse the colonies tend to remain discrete.

*Streptococcus A.*—Small cocci occurring in chains of five or six as a rule, staining somewhat feebly with simple stains, but retaining the stain well in Gram's method.

*Gelatin plate culture.*—Small white colonies, a cup of liquefaction forming around in about three days.

*Gelatin stab culture.*—Rapid growth on the surface of a white mass, discrete circular colonies along the needle track. Liquefies the gelatin, starting on the surface, spreading out to the side of the tube, and then more slowly along the track of the needle.

*Agar slope culture.*—Fairly plenteous white growth in twenty-four hours.

*On potato.*—Whitish colonies form in three days' time, about the size of a pin's head (potato kept at room temperature).

*Streptococcus B.*—Small cocci, occurring in chains of from three to eight, staining well with simple stains, and also by Gram's method.

*Gelatin plate culture.*—In three days' time small whitish yellow colonies may be seen, having a blurred outline.

*Gelatin stab culture.*—Along the needle track, small pale yellow discrete circular colonies, growing somewhat rapidly, on

the surface a yellow rounded mass. Does not liquefy the gelatin.

*Agar slope culture.*—A whitish yellow growth, spreading irregularly over the surface.

*STREPTOCOCCUS C.*—Very small cocci occurring in chains varying in length up to about fourteen in a row. Staining well with simple stains, and retaining the stain by Gram's method.

*Gelatin plate culture.*—Small brown circular colonies easily visible to the naked eye.

*Gelatin stab culture.*—Yellowish growth along upper part of stab in about four days, but growth is very slow, and there is no growth on the surface. Does not liquefy the gelatin.

*Agar slope tube.*—Very slight delicate growth, in the form of small colonies visible on the fourth day after being placed in the warm incubator.

*STREPTOCOCCUS D.*—Cocci occurring in chains of varying lengths, larger than *Streptococcus B.*, staining with simple stains, and also by Gram's method.

*Gelatin plate culture.*—Light yellowish-coloured colonies, very minute, hardly visible to the naked eye in three days.

*Gelatin stab culture.*—Along needle track small white growth, tendency to the formation of discrete colonies, growth more plentiful on the surface, and white in colour.

*On agar.*—Three unsuccessful attempts were made to get the streptococcus to grow on agar. Also there was a negative result on blood serum.

*STREPTOCOCCUS E.*—Large cocci occurring in chains of 7 to 10, staining with simple stains, but quite decolourised by Gram's method.

*Gelatin plate culture.*—Very small circular colonies with sharply defined margins, only visible with low power of microscope after three days' growth.

*Gelatin stab culture.*—Very slight white growth along needle track ; none at all on the surface. Does not liquefy the gelatin.

*Agar slope culture.*—Plenteous dirty white moist looking growth, spreading irregularly over the surface.

*STAPHYLOCOCCUS A.*—Cocci occurring in thick clusters.



Stain well with simple stains, but decolourised by Gram's method.

*Gelatin plate culture.*—Small pearly white colonies just visible to the naked eye, which after being kept many days do not appear to increase much in size.

*Gelatin stab culture.*—There is a plenteous growth on the surface, and a slight delicate growth along the needle track; in the three days' time liquefaction has well commenced. Liquefies the gelatin, mostly at the surface, spreading down the gelatin in a cone-shaped form, a white precipitate of cocci falling to the bottom of the cone.

*On agar slope culture.*—There is a dirty white growth all over the surface, in three days' time, in the warm incubator.

STAPHYLOCOCCUS B.—Cocci, about the same size as Staphylococcus A, occurring however, in much more regular bunches; staining well with the basic stains, and also by Gram's method, the latter somewhat faintly.

*Gelatin plate culture.*—Canary-yellow coloured colonies, the size of a pin's head.

*Gelatin stab culture.*—Discrete colonies at the bottom of the stab, plentiful growth on the surface; cupping commencing in three days' time. Liquefaction well established in four days' time, spreading slowly down the stab.

*Agar slope culture.*—Enormous, dry, scaly-looking growth in twenty-four hours, radiating outwards on either side of the original stroke.

STAPHYLOCOCCUS C.—Large cocci, generally in clusters of from 3 to 20, staining with the simple stains, but decolourised by Gram's method of staining.

*Gelatin plate culture.*—Small dark coloured circular colonies, with well-defined margin.

*Gelatin stab culture.*—Small discrete colonies along the needle track, very few and delicate, no growth on the surface. Does not liquefy the gelatin.

*Agar slope culture.*—Small discrete colonies along needle track, few in number.

**BACILLUS A.**—Thick bacilli with blunted ends ; some of the bacilli are very short. These bacilli were motile in a hanging drop. Stain with the simple stains, and retain the stain well by Gram's method.

*Gelatin plate culture.*—Yellowish colonies about the size of a millet seed in three days' time, with a very ill-defined margin.

*Gelatin stab culture.*—A somewhat limited growth along the needle track, with formation of discrete colonies in parts ; growth on surface irregular in shape. Does not liquefy the gelatin.

*Agar slope culture.*—Profuse milk-white growth, spreading all over the surface in thirty-six hours.

**BACILLUS B.**—Thin rod-shaped bacilli, four times as long as broad, with well-defined ends. Staining with simple stains ; decolourised by Gram's method.

*Gelatin plate culture.*—Small dirty-white colonies, about the size of a pin's head, not characteristic.

*Gelatin stab culture.*—Small discrete colonies form along the needle track ; profuse white growth in three days' time on the surface of the gelatin. Does not liquefy the gelatin.

*Agar slope culture.*—Very white, glistening, heaped-up growth, all along the stroke forming very rapidly.

*On potato.*—White somewhat raised colonies, the size of a millet seed.

**BACILLUS C.**—Short thick staves, with rounded ends, about twice as long as broad ; staining with basic stains, decolourised by Gram's method.

*Gelatin plate culture.*—Small yellowish-white colonies, commencing to liquefy in forty-eight hours.

*Gelatin stab culture.*—White growth along needle track, and plenteous white growth on surface in forty-eight hours. Liquefaction well established in forty-eight hours, and in the course of another twelve hours has spread right out to the side of the tube ; then in the next few days, comparatively slowly, spreads down the stab ; in seven days the whole of the gelatin has liquefied.

*Agar slope culture.*—Dirty white growth, separate colonies

about the size of a pin's head, at first, but they soon merge together.

*On potato.*—Light brown colonies, much raised off the cut surface of the potato.

*BACILLUS D.*—Very minute bacilli, much the smallest of any I have found (occurring in thick clumps). Stain with ordinary basic stains; decolourised by Gram's method.

*In Gelatin plate culture.*—Very small yellowish colonies, with well-defined margin.

*In Gelatin stab culture.*—Slight growth along needle track, on surface plentiful irregular growth. Does not liquefy the gelatin.

*Agar slope culture.*—White, glistening growth, not characteristic.

*On potato.*—Brown heaped-up colonies, in four days' time the size of a pin's head.

*BACILLUS E.*—Short bacilli, with rounded clubbed ends, staining with simple stains, but being decolourised by Gram's method.

*Gelatin plate culture.*—Small white colonies, around which at the end of the third day cupping takes place.

*Gelatin stab culture.*—Copious white growth on the surface of the gelatin in three days, also along the needle track. Liquefaction beginning at the end of the third day, and by the end of the fourth day has spread out to the side of the tube.

*Agar slope culture.*—A profuse white, somewhat glistening growth at the end of twenty-four hours.

*On potato.*—Dark brown colonies, the size of a pin's head in four days' time.

*BACILLUS F.*—Minute bacilli, rod-shaped, staining with simple basic stains, and retaining the stains in Gram's method.

*Gelatin plate culture.*—Small whitish-yellow circular colonies, with sharp outline.

*Gelatin stab culture.*—Very slight growth along the needle track, copious growth on the surface, very light yellow in colour. Does not liquefy the gelatin.

*Agar slope culture.*—The bacillus grows very rapidly, forming largish white colonies, which have to remain discrete.

**BACILLUS G.**—Short, minute rod-shaped bacilli, many being so small as to appear like cocci; staining with ordinary stains, and retaining the stain in Gram's method.

*Gelatin plate culture.*—Small delicate white colonies, hardly visible to the naked eye, appear in three days' time.

*Gelatin stab culture.*—Delicate white growth along the needle track, very slight growth on the surface of the gelatin. Does not liquefy the gelatin.

*Agar slope culture.*—In 18 hours in the warm incubator there is a plenteous white growth, rapidly spreading all over the surface of the agar.

**BACILLUS H.**—Bacilli with rounded ends, about twice as long as broad; staining with simple stains, quite decolourised by Gram's method.

*Gelatin plate culture.*—Small circular colonies, of a canary yellow colour appear in three days' time.

*Gelatin stab culture.*—Very slight growth of a yellow colour along needle track, and on the surface of the gelatin a yellow heaped-up growth. Does not liquefy the gelatin.

*Agar slope culture.*—Plentiful yellow growth in three days' time, spreading irregularly all over the surface.

**BACILLUS K.**—Short thick staves, with rounded ends, staining well with the basic stains, and retaining the stain by Gram's method.

*Gelatin plate culture.*—Dirty white colonies, which with a hand lens appear to be of a bluish colour.

*Gelatin stab culture.*—Minute discrete colonies, all along the needle track, white circular growth on the surface of the gelatin. Does not liquefy the gelatin.

*Agar slope culture.*—An enormous, white heaped-up growth of a dirty white colour.

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## REPORTS OF CASES.

### 1.—TUBERCULAR ULCER OF TONGUE.

### 2.—PERFORATING APPENDICITIS; PORTAL PYÆMIA.

BY W. F. HASLAM,  
SURGEON TO THE GENERAL HOSPITAL; AND  
STUART McDONALD,  
PATHOLOGIST TO THE GENERAL HOSPITAL.

#### CASE OF TUBERCULAR ULCER OF TONGUE.

V. C., a man age 45, was admitted to the General Hospital on June 30th, suffering from a sore tongue. From the history it appeared that he had been in his usual health till twelve weeks previously, when he suffered from an attack of Influenza. There was however a history of slight cough and night-sweating for the past six months. He could not speak definitely as to loss of weight. He was attended by Dr. Rowland and soon recovered from his illness, but shortly afterwards he noticed something wrong with his tongue. A small, somewhat painful pimple developed just to the right of the tip of the tongue. This soon became a small white blister which broke down, discharging a small amount of matter. This was cauterised three times by his doctor, the ulcer apparently healing, but soon breaking down again. After the third application the sore slowly enlarged and he was sent to the hospital for further treatment. On admission, patient looked in fairly good health, and with exception of his tongue complained of nothing.

*Family history.*—Patient is a married man with two children, both healthy. His father is alive and well; his mother died of "stroke." He has a sister and two brothers, all healthy. He has had no illness himself previous to the influenza; no suspicion of syphilis. He is a moderate smoker and drinker; is a brewer's labourer, and is often in the habit of chewing malt. There is nothing else of importance in his personal history.

*Local condition.*—Immediately to the right of the middle of the tongue at its tip is a small round ulcer, about a quarter of an inch in diameter. It is shallow and covered with pale flabby granulations. The edges are firm, slightly raised, and very distinctly undermined in its entire extent. There is only very slight surrounding induration. The floor of the ulcer is uniformly smooth; no tubercles or caseous points to be seen. There are no enlarged glands below the jaw. Some of his molars are decayed, but there is no irritating stump corresponding to the ulcer. The ulcer is painful but not excessively so. His appetite is fair. A careful examination of his chest failed to show anything abnormal.

Examination of the testicles shows distinct enlargement of the globus minor on both sides, with slight thickening of the vas on the right side. There is nothing abnormal to be felt in the vesiculæ. The appearances are suggestive of early tuberculosis, but the diagnosis cannot be confidently made. Nothing else abnormal is to be found anywhere.

A diagnosis of tubercular ulcer of tongue was made and free excision was determined on.

On July 5th, the patient having been anæsthetised, the ulcer was widely excised. A pair of clamp forceps having been applied to left of the middle line of the tongue, and another pair at right angles to the first on the right side about an inch and a quarter back from the tip. The enclosed portion was excised, the entire thickness being snipped through with straight scissors. Hæmorrhage, which was free, having been arrested, the loose mucous membrane on under surface of the tongue was brought up over the face of the stump, and united to the mucous membrane on the dorsum by several catgut sutures.

*Progress of Case.*—Healing of the tongue was rather slow, several of the sutures giving way, but a good stump was obtained and the tongue was absolutely healed before the patient left the hospital, on July 27. While in hospital, patient had no cough, no night sweating, and his temperature was sub-normal nearly all the time, only rising to 99° after the operation. He was taking his food well before he left and felt quite well.

*Microscopical report on part excised.*—The tongue shows a shallow ulcer, whose floor is covered with ordinary granulation tissue. The edges are slightly nodular and the undermining is very apparent. At the margins close below the epithelium are several typical giant-cell systems accompanied by congestion of superficial vessels and a wide spread small cell infiltration. In the deeper parts of the floor of the ulcer are a few other tubercles, but the most typical giant-cell systems are seen even deeper among the muscle fibre. Some of the tubercles are nearly half-an-inch from the surface; some show as many as four and five giant-cells, and some of these latter show vacuolation. The muscle fibres are separated by a diffuse infiltration of small round cells, and at places the larger vessels show distinct thickening of their walls. In some sections stained by the Ziehl Neelsen method, tubercle bacilli could be demonstrated, but only in exceedingly small numbers. The free edges of the excised portions were apparently free from tubercle.

As Butlin\* remarks, "it is well that the attention of the profession should be called anew at not too distant intervals, to the occurrence of ulcers of the tongue, which are rarely seen, difficult to diagnose and apt to be overlooked."

Even secondary tubercular ulcers, complicating well-marked pulmonary tuberculosis, are apparently very uncommon, while cases of primary ulceration, such as the above described, are still more rare. The present case did not present such difficulties of diagnosis as are sometimes met with. The appearances were so unlike either syphilis or cancer, that tuberculosis was early thought of.

With regard to the prognosis of tubercular ulceration of tongue, it is difficult to realise the statements, of Butlin,† Waterhouse‡ and others, that the outlook is as gloomy as in malignant disease. This must refer, however, only to the cases of secondary ulceration. Too few cases of primary ulceration

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\* Butlin. Diseases of the Tongue.

† Butlin. Diseases of the Tongue.

‡ Waterhouse. Treves' System of Surgery. Vol. II.

are yet on record to justify such a statement. The subsequent history of this case will be carefully observed. It is of course possible that there is some undetected tuberculosis of the lung, but the absence of any signs or symptoms, during patient's stay in hospital is good evidence to the contrary. As has been said, the condition of the testicles is only suspicious.

The microscopical appearances in this case have an important significance in relation to diagnosis and treatment. In the first place, the scarcity of the bacilli seems to indicate that too much reliance must not be placed on their absence in scrapings from such ulcers. A positive result would of course be of the greatest importance; but it would appear that many films might have been examined in this case before any bacilli could be found. A more important aid to diagnosis would be the microscopical examination of a small piece of the ulcer, which could be easily excised. If found tubercular, a freer excision could then be done.

Lastly, as to treatment. The presence of undoubted tubercular tissue so far from the surface, emphasises the importance of a free excision. The cautery would never be sufficient in such a case as this. Early and free removal may yet prove that primary tubercular ulceration of the tongue is a curable condition, and not to be considered for a moment in the same category as the secondary ulcerations.

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#### A CASE OF PERFORATING APPENDICITIS WITH PORTAL PYÆMIA.

The following case is of interest as illustrating a most uncommon complication of Appendicitis.

F. A., a boy, 8 years old, was brought to the General Hospital, on July 9th, with the following history:—Twelve days previously he developed acute abdominal symptoms, severe pain in right side of abdomen between costal margin and ilium, with almost continuous sickness. There was a history of rigors on three different occasions. The bowels had been moved normally every day



with the exception of two days just before admission, when he had diarrhoea. He was seen by a doctor who ordered hot fomentations, but as his condition was getting steadily worse he was sent to the hospital. No previous illness. On admission, patient was extremely ill, complaining of severe pain in right side just below costal margin and coming forwards toward the middle line. There was acute tenderness in the same region. The abdomen was markedly distended, but an enema produced a free action of the bowels and reduced the distension considerably. Pulse 128. Temperature 102·5.

There was no sickness. The patient seemed to be in considerable pain and there was marked tenderness immediately below the right costal margin; this tenderness appreciably diminished as one passed from the ribs to the appendix region. The right iliac fossa was easily palpable, no tumour could be felt here. A definite tumour could be felt, projecting beyond the right costal margin for about three inches, in the right nipple line. On percussion, the dulness was continuous with the liver dulness. The upper margin of the liver appeared to reach the 6th rib. Over this tumour, coarse peritoneal friction was plainly felt by hand. The cause of the condition was not apparent, but as the symptoms distinctly pointed to the region of the liver as a probable focus, and the patient's general condition was so serious, it was determined to open the abdomen over the region of the tumour. An incision having been made through the right rectus close to the ribs, the enlargement of the liver was at once apparent. There was no peritonitis to be discovered, and no lymph anywhere, but the liver was distinctly darker and duller than normal. A careful exploration of the abdomen showed nothing further beyond some abnormal firmness of pancreas. The appendix was not actually felt, but there was no tumour to be felt in its usual site. As there appeared no indication to explore further, the wound was stitched up and nothing further done.

The further progress of the case was as follows:—On the morning after the operation the temp. fell to 96·5°, but in the

afternoon rose again to  $103^{\circ}$ , the pulse rate also rising from 96 at 10 a.m. to 156 at 2 p.m.

The general condition of the patient had evidently been in no way benefited by the operation. For the next five days his condition remained practically unchanged. His temperature ranging from  $100^{\circ}$  to  $104.8^{\circ}$ , his pulse from 120 to 160, but the abdominal distension increased during the last few days, and on the 14th the enlargement of the liver was more apparent than ever; on the 13th and 14th there were several rigors. Patient took a fair amount of fluid nourishment. At times patient exhibited an irritability almost suggestive of meningitis, otherwise he remained in a typical typhoid state. On the evening of 14th July he was manifestly weaker, his temperature becoming sub-normal. He rallied a little on the morning of the 15th, but at 5-20 p.m. same day he had a copious hæmorrhage from the bowel, much bright red clot being passed; death took place in about half-an-hour.

*Post mortem* examination, 36 hours later. The abdomen was distended; rigor mortis had passed off; there was evidence of *p. m.* decomposition in the colour of abdomen. On opening the abdomen the liver was seen to be enlarged, extending three and a half inches below costal margin. The liver showed greenish discoloration throughout, and on its surface numerous small abscesses were seen; many of these ruptured in removing the organ. On section the liver showed hundreds of abscesses varying in size from a pin-point to a hazel nut. They contained extremely foetid pus which had a pinkish colour in places. The larger cavities had sloughy walls, and a lining of soft pultaceous membrane. The abscesses were apparently distributed around the branches of the portal vein. On section the larger branches were seen in the centre with sloughy walls, and around were situated the abscesses, giving an arborescent appearance not unlike a broncho-pneumonia. The smaller abscesses showed an area of pallor and necrosis for a considerable distance around. There was early general suppurative peritonitis and a few ounces of purulent fluid in the pouch of Douglas. On separating some

recent adhesions round the ascending colon, an abscess cavity lying quite behind the colon was opened into. It was about two inches above the cæcum and about the size of a small apple. It contained gangrenous pus, gas, and recent blood-clot. Its walls were black and sloughy, and it communicated directly, through a ragged perforation about one-third of an inch in diameter, with the ascending colon. The vermiform appendix, two and half inches long, somewhat tortuous and adherent to posterior aspect of the cæcum and ascending colon, was directed upwards; its tip gangrenous and perforated, lay in the abscess cavity; an oval concretion about the size of a large pea was found in the cavity. There was diffuse thickening of the mesentery, and on section pus was seen to escape from the branches of the superior mesenteric vein. There was a large amount of pus and purulent blood-clot in the portal vein itself. In the transverse and descending colon there was some recent blood-clot, but there was none in the small intestine. There was an intensely foetid smell throughout the body.

The other organs show signs of general septic poisoning, the lungs especially being extremely congested and œdematous. There were no abscesses in any other part of the body. There was some congestion of cerebral membranes, but no meningitis. The pancreas was slightly enlarged and very firm, but showed no disease.

Cultures from the pus were overrun by putrefactive forms; an organism resembling *B. coli* was observed but not isolated.

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### AMBLYOPIA FOLLOWING HÆMATEMESIS.

BY J. JAMESON EVANS, M.B., F.R.C.S.

HONORARY SURGEON TO THE BIRMINGHAM AND MIDLAND EYE HOSPITAL.

AMBLYOPIA following loss of blood and exhausting diseases is a well recognised pathological condition, and amaurosis occurring after hæmatemesis is mentioned by Hippocrates though Pergens\*

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\* *Annales, Oculistique. Tome cxv.*

after reviewing the whole subject could find only about sixty recorded cases.

These present a diversity of symptoms and ophthalmoscopic appearances, and as the pathology of the condition is by no means elucidated, I feel justified in referring to the subject again and recording a recent case which exhibits some points of interest.

The patient attended the Birmingham Eye Hospital under the care of Mr. Eales to whom I am indebted for consent to publish the notes, and also for many valuable suggestions.

Mrs. B., æt. 50, attended as an out-patient on April 10th, 1896, giving a history of having suffered from a sudden failure of sight after an attack of vomiting of "black stuff" in January of that year. This vomiting her medical attendant attributed to gastric ulcer. At that time she had three attacks of vomiting, on successive days, associated with severe pain in the left side and between the shoulders, the amount of blood vomited, as roughly estimated by the patient, being about a pint on the first day, and a quarter of a pint on each of the following days. Immediately after the third attack, her sight failed to such an extent that she could not see a wineglass which was offered to her; next day, however, her sight had improved so that she could see things about the room. For a month she did not recover beyond this, but since then she has improved somewhat though never to regain her former visual acuity.

Patient had similar attacks of vomiting about four years ago, which, however, were not so severe, and which did not appreciably affect the sight.

*State on admission.*—Patient is somewhat pale, but not obviously anæmic. She is mentally depressed and emotional. The left eye is slightly divergent. Pupils are about 4 mm. in diameter. Pupil reflexes are all present, though sluggish, accommodation is good in each eye.  $RV = \frac{6}{8}$ ,  $LV = \frac{6}{24}$ . Colour vision is good. The light sense is diminished to  $\frac{1}{2}$  in the right eye and to a  $\frac{1}{4}$  in the left eye. Fields of vision are markedly contracted, particularly on the temporal and lower aspects.

*Ophthalmoscopic Examination.* — Right eye: media clear, general pallor and opaqueness of the optic disc, intensified on the nasal side. The inner edge is defined, but the outer is blurred, and has a yellowish tinge. The arteries and veins are diminished in calibre near the disc, and they show a rapidly increasing contraction as they approach the periphery. The arteries present irregular moniliform dilatations.

Left eye: Media clear, optic disc pale with a yellowish tinge. Edges fairly well-defined. The central cup is filled in with an opaque material which almost completely hides the vessels at this part. The arteries and veins are markedly contracted, the former more so than the latter, and the superior set more than inferior. As in the right eye, there is a rapid diminution in size as the vessels approach the periphery, the superior set being threadlike at a little distance from the disc. The arteries present the same irregular dilatations which were noted in the right eye. No pathological change was found in any other system.

Under Iron and Strychnine combined with Nitroglycerin the patient gradually improved. On June 20th  $RV = \frac{2}{3}$ ,  $LV = \frac{2}{3}$ . On August 1st her condition was not quite so good.  $RV = \frac{2}{3}$  most,  $LV = \frac{2}{12}$ . There was no apparent ophthalmoscopic change to account for this deterioration.

In January, 1897, her vision was again  $RV = \frac{2}{3}$ ,  $LV = \frac{2}{3}$ ; and there was a slight improvement in the visual fields.

Comparing this with other reported cases, the fields of vision present nothing unusual. In fact as far as one can judge from reports there is nothing characteristic about them.

Colour sense was good in this case, and this again is the general rule. The light sense was decidedly reduced, and this has been the rule in the few cases in which it has been recorded. It is worthy of note that there was no marked dilatation of the pupils notwithstanding the reduction in the light sense.

With regard to ophthalmoscopic appearances, atrophy of the discs is generally met with, but there is no record of the yellowish tinge which was so distinct in this case. Moniliform dilatations of the contracted arteries are also peculiar to this case.

According to Pergens no definite relation exists between the amount of blood lost and the severity of the blindness. In this particular case—even taking the patient's estimate, which is generally an exaggerated one—the loss of blood was comparatively slight.

*Pathology.*—Contracted blood-vessels, pallor and opaqueness of the optic disc, and contraction of the visual fields, constitute the outstanding features in this instance. Such changes are most likely of peripheral origin, and we can practically exclude central lesions, *e. g.*, hæmorrhages and serous effusions. Retrobulbar hæmorrhage, certainly, is followed by changes very similar in character to those noted above, but although bilateral hæmorrhages may happen simultaneously, the probability of such an occurrence is very remote, and should such a coincidence be imagined no improvement in sight could be looked for on the first day, as happened in the case under consideration.

Samelsohn suggests that the condition may be due to serous effusions into the optic nerve, but with such a comparatively small loss of blood, such an explanation is inadequate.

Neither does the ophthalmoscopic appearance suggest an atrophy consecutive to optic neuritis, on the contrary the appearance is perhaps more like the discs in retinitis pigmentosa than in any other form of atrophy.

The woolly centre of the left disc may perhaps be taken as evidence of some inflammatory action. I may say that the majority of ophthalmologists favour the theory of a postneuritic atrophy. In one case, which I had the opportunity of examining soon after an attack of hæmatemesis, there was marked hæmorrhagic neuroretinitis, but the associated anæmia was so pronounced that I am convinced that the hæmatemesis had little or nothing to do with the eye condition.

Retinal hæmorrhages, with atrophy of the nerve, are said to be very liable to occur with any gastro-intestinal lesion, but in a patient of this age they would undoubtedly leave indelible changes. Thrombosis of veins or arteries would likewise leave lesions visible on ophthalmoscopic examination.

Ziegler found fatty degeneration starting in the lamina cribrosa, and suggested a degenerative ischæmia as its cause, adducing spasmodic contraction of the arteries to explain the localisation of the degenerative process in the optic nerve.

It is possible that the primary effect, viz., the sudden and almost complete loss of sight was due to anæmia of the retinal elements from shock, such as may occur in fainting. Recovery from shock was followed by partial recovery of the rods and cones, but the periphery being the area less perfectly supplied with blood is, as we should expect, the part which has suffered permanently. The permanent result of contracted vessels and optic atrophy may be due partly or entirely to a toxæmia of intestinal origin.

*Prognosis*—It is evident that this case is not a progressive one. There was distinct improvement in central vision during the nine months she was under observation, but with regard to the visual fields and ophthalmoscopic appearances there was little or no change.

Pergens gives the following results, which are anything but favourable :—

|                        |     |     |             |
|------------------------|-----|-----|-------------|
| Death in               | ... | ... | 3 per cent. |
| Permanent amaurosis    | 44  | „   |             |
| Bad or moderate vision | 24  | „   |             |
| Fair vision            | ... | ... | 19 „        |
| Complete recovery      | ... | 8   | „           |

*Treatment.*—All that can be done is indicated in the course pursued in the case recorded. Paracentesis, iridectomy, and blood-letting have been tried with little or no success.

It is much to be regretted that the case was not seen at an earlier stage, so that much surmise could be replaced by few facts. The importance of ophthalmoscopic examination in all cases of hæmatemesis cannot be overrated, particularly as the defect of sight does not always cause anxiety to patients until they have recovered from the more troublesome gastric symptoms, and by that time pathological changes of a permanent nature may have taken place in the eyes.

## A CASE OF PRIMARY CARCINOMA OF THE LIVER.

BY DOUGLAS STANLEY, M.D., M.R.C.P.

THE following case presents features of sufficient interest to make it worth while to put it on record.

E. N., aged 29, was admitted August 3rd, 1899. The patient was by occupation a metal-roller, though in early life he had been a page-boy in the house of a well-known physician in London. He came to the hospital in the first instance with a varicocele on the left side, though he also complained of some "swelling" of the abdomen. On examination by the surgeons it was found that the chief trouble was the abdominal one, and on that account he was transferred to the medical side under my care. The patient stated that since two months previous to admission, viz., about the end of May, 1899, he had an attack of "indigestion," with occasional vomiting and pains in the epigastric region. These symptoms came on as a rule about half an hour after food. A few days subsequent to his first attack of vomiting the pains had extended, being felt in the back about the level of the iliac crests, and were most severe if he stooped, especially in picking up any heavy weight; when at last they subsided, he noticed that the abdomen was getting considerably larger. About the middle of July the general swelling had almost disappeared from the abdomen, but the patient noticed a well-defined "lump on the right side of the stomach." This was the more apparent to the patient because the swelling had so nearly disappeared from the left side. The severity of the pain had greatly lessened by the time of his admission, being then represented by occasional twinges, thus the patient did not seem to regard the abdominal condition very seriously. His previous history was uneventful; he had influenza six years ago, and no evidence of syphilis could be obtained.

His father died at 52, of "bronchitis and diabetes;" his mother at 54 of "dropsy." There are five brothers and four sisters, all being reported as healthy. The patient was a married man and the father of three children. His custom has



been to take a moderate amount of beer, but very rarely spirits. His appearance on admission was pale though of good muscular development. His weight, which had been going down latterly, was slightly over nine stones.

On examination there were distended veins all along the sides of the throat. There was no appearance of jaundice nor cyanosis. The tongue was somewhat dry and slightly furred. The upper half of the abdomen showed a large dense swelling, most apparent on the right side, extending from under the costal arch and moving slightly with the respiratory actions. It extended past the mid abdominal line to reach into the left hypochondriac region and downwards to the umbilicus, its lower border being well defined and slightly oblique downwards from left to right. In character it seemed irregularly rounded and on the surface could be felt three projections or bosses of much harder consistence and rounded in shape. No alteration could be detected in the neighbourhood of the gall-bladder. The spleen and other abdominal organs showed no change to physical examination, nor was there any evidence of fluid in the peritoneal cavity. There was no constipation nor any rectal lesion.

The circulatory system presented nothing of note except that the cardiac impulse was in the fourth left space, but internal to the vertical nipple line. The respiratory system was similarly free from any subjective or objective changes. There was no pain in or disorder of micturition; the urine was once noted as showing a haze of albumen. About a week after admission the patient complained of very severe pain, especially over the area of the swelling on the right side of the upper abdomen; he also vomited his food almost immediately after it had been swallowed. The temperature, which had been steady on admission, now began to show considerable variation. His weight was now found to be less than on admission by about ten pounds.

The diagnosis that immediately suggested itself was malignant growth of the liver, though in the interest of a male patient aged twenty-nine, the possibility of gummatous tumours of the liver

was thought of. Unfortunately there was but little to support the theory. The hardness of the three swellings on the surface of the enlarged liver rendered hydatid impossible.

There seemed, therefore, no hope that the case was other than malignant growth, and if so, of what nature and origin? The nodular character with great increase in the size of the liver pointed to cancer, and as no evidence of growth in any other organ was to be obtained, the case seemed to resolve itself into one of primary carcinoma of the liver. In justice to the patient, however, he was given iodide of potassium. This was without any effect.

The patient continued to have irregular pyrexia and pain of a severe character accompanied by vomiting. There was also increasing tenderness over the area of the spleen, though the organ showed no enlargement.

On August 16th, thirteen days after admission, the patient became collapsed. The temperature rose to 102.8; there was marked cyanosis, rigidity of the limbs, and laboured respiration. These symptoms gradually increased in severity, and the patient died at 5.30 a.m.

On *post mortem* examination, the liver was found to weigh 11½ lbs. It showed a very great number of nodules through the capsule; some, especially the larger, projected from the surface and were depressed in the centre. These nodules were of a cartilaginous hardness and a yellowish grey colour, the smaller being slightly translucent. The whole liver was affected, but the right lobe showed the greatest abundance of growth. The gall bladder was unaffected. None of the other abdominal organs showed any growth, careful search being made throughout the alimentary system in particular. The kidneys showed some slight interstitial nephritis. The heart was somewhat enlarged, and the curtains of the mitral valve showed some thickening. There were a few small nodules of a pale grey colour and evidently secondary in character in each lung.

Microscopic examination of the liver showed masses of growth of various sizes, the smaller being chiefly cellular, the larger

containing stroma. In those masses showing stroma the altered epithelial cells were arranged in irregular columns converging towards the centre. These cells were irregularly cubical, not being in any way columnar.

It will be seen that the autopsy verified the diagnosis of a primary carcinoma of the liver. The age of the patient and the small amount of constitutional effect till within the last week of his life are two very interesting points in the case.

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## REVIEWS.

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### A MANUAL OF SURGICAL TREATMENT.\*

THE aim of the authors in writing this book is to supply the often-felt want of detailed information concerning surgical treatment, especially as regards the after-treatment of patients. The subject of Surgery is so large that in the ordinary text-book, while the sections on pathology, diagnosis, etc., are full and explicit, those on treatment are too often short and scanty. The book now under review is in no sense to be classed among the many manuals of practical surgery, but is rather a full treatise on surgical treatment, so far as the subjects dealt with are concerned, and it will, we are quite sure, be found equally valuable by the operating surgeon, the general practitioner, and the house-surgeon.

Chapter I contains a very full account of the surgical treatment of inflammation, and gives careful and minute directions for blood-letting, for the application of heat and cold, for the making of poultices, and for treatment by the actual cautery, and other forms of counter-irritation. The directions are given

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\* A Manual of Surgical Treatment. By W. Watson Cheyne and F. F. Burghard. In six parts. Part i., pp. 285. Price 10s. 6d. London: Longmans, Green and Co.

in such a way that a house-surgeon, who has only recently been qualified and who has, let us say, never seen the actual cautery used, should, after reading this chapter, be able to apply the cautery properly, and not in the rough and ready way so often seen.

In Chapter 2 the subject of acute suppuration is dealt with in a similar manner. We notice with some surprise that, in the section dealing with acute cellulitis, no mention is made of the necessity for examining the urine.

Chapter 3 contains an account of the treatment of ulcers, commencing with remarks on the treatment of ulcers in general, of course with special reference to those on the leg. Naturally confinement to bed is advised for patients suffering from callous ulcers on the leg, and we are glad to see that stress is laid on the importance of proper disinfection of the ulcer as a preliminary to any other treatment. It is stated that "at the present time strapping is generally given up in favour of the elastic bandage." This may be so, but we are quite convinced that strapping is the treatment *par excellence* for callous ulcers of the leg as met with in the out-patient room. The description of skin-grafting is the clearest and most instructive that we remember to have met with.

Another chapter is devoted to the treatment of gangrene. The authors advocate amputation for senile gangrene, and make the somewhat strong statement that "the patient, if left alone, will almost certainly die from the senile gangrene, and therefore that amputation offers practically the only chance." While admitting that amputation for senile gangrene is becoming more favourably thought of, yet it is not our experience that the expectant treatment is as unsuccessful as the above-quoted statement implies. The account of the treatment of Raynaud's disease is particularly good and full, the use of the electric current being given the first place among therapeutic measures.

The section on anæsthetics is written by Dr. Silk, and gives an excellent short description of the subject, not overloaded with discussions of different theories, but terse and practical. Dr.

Silk describes the method of producing local anæsthesia by infiltration, but rightly remarks that "it does not overcome many of the difficulties and objections made to local anæsthesia in general."

About 100 pages are given up to the subject of wounds and their complications, and this section includes such subjects as the preparation of patients for operation, transfusion, hæmorrhage, shock, tetanus, and erysipelas. As might be expected in a book of which Mr. Watson Cheyne is one of the authors, the aseptic method in the treatment of wounds is by no means strictly adhered to, but great reliance is placed upon the use of strong antiseptics. In some instances, *e.g.*, in the case of lacerated wounds, it is even advised that the wound should be sponged with undiluted carbolic acid. While admitting that, though for a condition like septic stomatitis nothing is so efficient as the application of pure carbolic acid, yet we cannot help thinking that the sponging of a fresh wound with the pure acid is quite unnecessary. The use of sponges instead of wool mops is advocated on page 164. We agree with the authors that for softness and for absorbent action the sponge has no rival, but to render its use safe it must be carefully prepared, and we notice that, while the method of cleansing sponges after an operation is described, no instructions are given as to how to primarily prepare them when in their rough state. On the same page it is stated that "the swabs as ordinarily prepared by nurses are very often septic." This may be so, but not if the swabs are properly sterilised, and after all, sterilisation is a simple enough process. It is advised that during an operation the instruments should be kept in carbolic lotion, but that before they are used they should be rinsed in 1 in 2000 sublimate solution. Is this really intended? Anyone who has ever placed a steel instrument in sublimate solution will at once appreciate the objection to this proceeding. After all, the antiseptic and the aseptic methods for the treatment of wounds aim at the same object, and we are quite sure that Messrs. Cheyne and Burghard are right when they say that in actual practice, more

especially when operating in a private house, it is not well to entirely exclude the use of chemical antiseptics. The book ends with a chapter on the treatment of tumours, detailed descriptions being reserved till the tumours of special parts are dealt with.

We have given a full review of the first part of this work, because, taking the volume as it stands, it is one of sterling merit, and because, though we have ventured to criticise some passages in it, we are not blind to the fact that the authors have dealt with difficult subjects in quite a masterly manner, and have produced a book which should be in the hands of every practitioner who is called upon to treat surgical cases. We await with great interest the appearance of the other parts of the book.

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#### TEXT-BOOK OF OPHTHALMOLOGY.\*

THE appearance of a second edition of this well-known work has been expected for some time. Since the first English edition was published, five German editions have been issued, and quite a host of books on Ophthalmology have been published in England and America. The appearance of this edition gives us the opportunity of making a fair comparison of this standard work with its new rivals.

In the preface we are informed that "although alterations will be found on almost every page the most marked changes will be met with in the sections on functional examination, the pathology of corneal and conjunctival diseases (especially the parts relating to ulcer serpens and diphtheria), and the diseases of the fundus. Over eighty illustrations have been added." The translator has also introduced two new sections: one upon heterophoria, and another on the use of homatropine and other

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\* Text-book of Ophthalmology. By Dr. Ernest Fuchs, Professor of Ophthalmology in the University of Vienna. Authorised Translation, revised from the Seventh enlarged and improved German Edition, by A. Duane, M.D., Assistant Surgeon Ophthalmic and Aural Institute, New York. Second Edition. London: H. K. Lewis.

cycloplegics, and the general subject of correction of refractive errors.

The first part of the book is concerned with the objective and functional examinations of the eye. The former includes the principle and the application of the ophthalmoscope, the examination of the refractive media, and the determination of refraction by objective methods. The subject is briefly though adequately dealt with, and we can recommend the original and lucid explanation and description of the shadow test. The functional testing includes the examinations of the field of vision and of the light sense, and the determination of simulated blindness. This is also brief, and we could wish for a still further extension in this direction.

The second part treats of organic diseases, and includes diseases of the conjunctiva, cornea, sclera, uvea, lens, vitreous, retina and optic nerve, as well as glaucoma, diseases of the lids, lachrymal organs and orbit, and disturbances of motility of the eye.

The third part deals with anomalies of refraction and accommodation, including the theory of glasses and the optical properties of the normal eye. The fourth part gives an account of the ordinary operations practised in Ophthalmic Surgery, and in the Appendix we find illustrations of some of the instruments in general use. The general arrangement of the book is the same as in the previous edition; the essential matter being printed in larger type, while smaller print is employed for controversial and more detailed information. The latter, however, is by no means of less importance or interest, and indeed forms some of the most readable and edifying sections of the book. The regional diseases are in all cases preceded by a concise and well-illustrated anatomical description of the part, and this method commends itself to us in preference to the practice of having a section devoted exclusively to the Anatomy of the Eye and its Appendages at the beginning of the book. A good description of the development of the eye is also included. The physiological part of the subject has been brought well up to

date, and for this, as well as for the anatomical section, a number of new and meritorious diagrams and drawings have been introduced. The other sections of the different chapters are judiciously treated and on the whole well-balanced. If anything, the therapeutical part is somewhat brief. The drugs mentioned are certainly well selected, and have stood the test of time, but the choice is very limited and there is no mention of any of the newer drugs, which have found favour with many ophthalmologists. The same conservatism with regard to drugs is to be observed in the selection of antiseptics for operative work and in the choice of cycloplegics and mydriatics. The masterly exposition of the pathology and ætiology of diseases of the conjunctiva and cornea will, we hope, lead to a more uniform terminology, and relieve us of the multiplicity of synonyms which have so far characterised the nomenclature of conjunctival and corneal affections.

The translator is to be congratulated upon his chapter on Heterophoria, a subject which is explicitly and comprehensively discussed. The introduction of this section distinctly adds to the usefulness of the book.

In the description of the mechanism of accommodation, the theory of Helmholtz is exclusively adopted, and no mention is made of the investigations of Young and Tscherning on the subject.

The instruments depicted are well selected, and are of the most approved modern type. We find among others, those of Stevens, for partial tenotomy, but we do not find in the text an adequate description of how they should be used for such operations. Though we agree with the author as to the futility of such operations, we think it would be well to give the uninitiated some idea of the operation for which the instruments were originally invented.

Some things must necessarily be omitted to keep the volume in the category of text-books, and the omissions mentioned do not in anyway detract from the general merits of the book, and notwithstanding the number of recent ophthalmic publications,



it is evident that Prof. Fuchs's treatise will still be the standard text-book in Ophthalmology.

The translator's work is highly praiseworthy and his free and facile language gives the book a charm apart from the excellence of the subject matter.

J. JAMESON EVANS, M.B., F.R.C.S.

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### AIDS TO THE DIAGNOSIS AND TREATMENT OF DISEASES OF CHILDREN.\*

THIS book forms one of the students' aid series, and contains in a short space and handy form a very great deal of useful information. The opening chapters refer to the time-worn subject of infant feeding, but the author manages to convey in a few pages a very clear idea of the principles of this difficult but all-important subject. Diseases of the digestive tract naturally follow. In every case the description is extremely short and to the point. We notice here an absence of those tedious details which render some books hard to read.

Chapter 6 deals with the Specific Fevers, in which the essentials of diagnosis are very clearly set forth; and the account of Typhoid Fever might perhaps have been a little fuller and the difficulties of its diagnosis in children emphasised rather more strongly, as this is one of those diseases where the physician not acquainted with the infantile manifestation of the disease may easily go wrong. The subject of Glandular Fever is also mentioned and is defined as an acute infectious fever characterised by inflammatory swelling of the deep cervical and other lymphatic glands accompanied by constipation and followed by a considerable degree of anæmia and depression. In this disease there is no sore throat and nothing to account for pain in swallowing, which forms a marked symptom of the disease, and on the second

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\* Aids to the Diagnosis and Treatment of Diseases of Children. By John McCaw, M.D., Senior Physician to the Belfast Hospital for Sick Children. Second Edition. London: Baillière, Tindall and Cox.

or third day an elongated swelling due to some inflammatory enlargement of glands is perceived beneath the sterno-mastoid muscle. This usually first appears on the left side and is followed by a similar condition on the right. The liver, spleen and mesenteric glands usually show some enlargement. Pyrexia disappears in the second week and the course of the disease is generally benign. Convalescence is slow, and as a rule the child is depressed and anæmic. Nephritis is occasionally a complication. The treatment consists in absolute rest in bed and the administration of small doses of calomel and saline purge. The existence of this disease is not sufficiently recognised, and we are glad to see such an excellent description of it as this writer gives.

Diseases of the lungs come in for their fair share of consideration. Though here some of the descriptions of pathological anatomy are not quite in accordance with a good deal of the teaching of to-day, at the same time the essentials are given, and that is after all the chief point. In the same way the description of the blood diseases rather lacks detail. The account of chorea is rather on old-fashioned lines. At the end of the book are various recipes of practical use in making different kinds of food. There are also tables of reference of the incubation period of the specific fevers, pulse rate at different ages, dentition tables, etc.

In conclusion, we can say that this work, though small enough to go into the pocket, contains very practical information, and we can strongly recommend it to those going into practice.

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#### THE MEDICAL ANNUAL.\*

WE have received a copy of the Medical Annual for the seventeenth year of its existence, and like its predecessors, it fully maintains its claim as a most important book.

The first article is a review of the changes in the pharmacopœia.

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\* The Medical Annual. Bristol: John Wright & Co. 1899.

Under the head of *New Remedies* are valuable descriptions of recent investigations, as those by Prof. T. R. Fraser on *Serpent Venom*. *Strophanthus* is indicated in rapid recurrence of cardiac systole with diminished force and irregular rhythm, *Bright's Disease* when associated with permanent high arterial tension, and also the conditions of arterio sclerosis and senile rigidity of arteries, in conditions where diuresis is required and can be promoted by increased blood pressure. It is also of use where, on account of urgency symptoms, a rapid effect is required, as *strophanthus* is much more brisk than other drugs of this class, and it is also useful in cases where the action must be prolonged. There is a description of the recent preparations of tuberculin in which the differences in later preparations and the earlier ones of Koch are pointed out. There is a useful description of X ray work, in which several important and practical hints are given. This article cannot fail to be of great use to those taking up the subject for the first time. In the same manner, the subject of electro therapeutics is represented by an interesting article from the pen of Dr. Rockwell. Climatic and open air treatment of phthisis forms the subject of a contribution by Dr. de Havilland Hall in which the writer makes the remark that the tuberculous patient should not return to the environment in which he contracted the disease, a point which this writer says is too frequently overlooked. One of the most practical articles is that on "*Pain as a Diagnostic Symptom in Abdominal Disease*," by Mayo Robson. Very many mistakes in abdominal diagnosis arise from ignorance of the topographical distribution of the pain. The articles on special subjects, such as diseases of the Eye and Ear are, as in former numbers, practical and up to date, and in many instances treated in such a way as to be of great use to the general practitioner who may perhaps be beyond the reach of the specialist. There are various surgical articles, such as those by Hurry Fenwick on the Prostate, specially in relation to tubercular disease; that on Surgery of the Skull by Senecca Powell, and especially on the Spinal Cord by Thorburn.

We have also to notice the continuation of a series of plates

on bacteria, which formed so important a feature of last year's Medical Annual.

The publishers can certainly be congratulated on the last issue of their well-known compilation.

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BRADSHAW'S DICTIONARY OF BATHING PLACES,  
CLIMATIC, HEALTH RESORTS, ETC.\*

WE have received a copy of this book, which contains much useful information. In many respects it is a valuable work of reference for the consulting room, but we cannot quite reconcile ourselves to its method in every particular. Thus, we can understand that the ordinary English invalid might like to have the name of an English medical man in some foreign health resort, European, African, or elsewhere. When, however, it comes to giving the names of medical practitioners in seaside towns and other health resorts in the United Kingdom, we feel that some protest should be entered, especially when one or two names are mentioned and others referred to as "etc."

Another point which strikes us is, that the work contains too much medical information for the lay reader. Any person taking it up might be tempted to select his or her own health resort without proper professional advice—a proceeding very apt to be attended with disappointing results. At the end of the book are two glossaries, one of medical terms, obviously for the lay reader, and particularly amusing in some of its definitions; the other a list of diseases and where best they can be treated. We should be sorry to find patients following the indications here given on their own responsibility. Thus, in some other form we would be prepared to welcome the book, but in the present, we are compelled to say it has many drawbacks.

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\* Bradshaw's Dictionary of Bathing Places, Climatic, Health Resorts, etc.  
London: Kegan, Paul, Trench, Trübner and Co. 1899.

### CHEMICAL AND MICROSCOPICAL AIDS TO CLINICAL DIAGNOSIS.\*

THIS book is intended, as its name implies, as a guide to practical examinations of the urine, gastric contents, blood, etc. The matter has been covered time and again in the numerous works on clinical diagnosis, but at the same time we certainly think that this work, freed as it is from the burden of case-taking, will certainly be of use. It is much easier to find exactly the information that one wants, or the formula required for a re-agent here than in several books we could mention, notwithstanding their much more ambitious tendency. The examination of the urine occupies fully half, and is accompanied by good illustrations. The description of each test is given in a clear practical style. In the same manner, the section on analysis of gastric fluids, though short in reality, contains everything which is likely to be required under any ordinary circumstances.

The chapters on the Blood do not attempt any more than they profess, namely—methods; except under the heading of Malaria, a short description being given accompanied by a chart of the characteristic signs of the various parasites. We certainly think that this book will prove of considerable use in the clinical room.

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### BURDETT'S OFFICIAL NURSING DIRECTORY, 1899.

THIS is a useful work of reference, and experience has shown that a want is filled by its publication. There is a Directory of the various Training Institutions in the kingdom, together with much valuable information relative to each hospital. There is an outline of the principal laws which affect Nurses, which also shows the position of the nurse in certain ways not exactly defined by law, but none the less important. Thus it is clearly shown that a nurse is not a doctor, and if she would assume the

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\* Chemical and Microscopical Aids to Clinical Diagnosis. By Castairs C, Douglas. Glasgow : James MacLehose & Sons.

rôle she lays herself open to certain difficulties. A large portion of the book is taken up by the Directory of Nurses. We hope that in time this may be more widely known by nurses and therefore more complete. The book is one which should be placed in every Nursing Home or Institution.

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*PUBLISHERS' DEPARTMENT.*

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**New Inventions, Drugs, etc.**

WE have received a sample of their Unguentum Zomēla from the Zomēla Company. This is an ointment of zinc and lead, formed by a combination with a sterilised lanoline base. From trials we have had carried out we believe this is a most satisfactory preparation in many ways. It does not seem to undergo any decomposition, and retains its consistence and pleasant appearance in hot weather. The use of such preparations in some cases of acute disease of the skin is sometimes attended by disappointing results, unless the base of the unguentum be reliable. In the Unguentum Zomēla we believe this object has been attained, and the result is a very pleasant and agreeable preparation. We would suggest to the manufacturers to put up their lead and zinc preparation in small metal boxes for the use of cyclists. It sometimes happens at the end of a long ride that one would like some such preparation, when there may have been some irritation of the skin. The ordinary preparations have the drawback of being too greasy to carry about on a machine

We hear the same firm propose making up all the B.P. unguenta in a similar manner.

We have also had samples of Sapo Zomēla and Zomēla Shaving Paste with which we have been much pleased.

### New Books, etc., Received.

- From Henry J. Glaisher—  
 Asthma. By Ernest Kingscote, M.B.  
 Constipation and its Modern Treatment. By George Hashall,  
 Second Edition.
- From H. K. Lewis—  
 Enlargement of the Prostate. By C. Mansell Moulin, M.D., F.R.C.S.  
 Skiagraphic Atlas of Fractures and Dislocations. By Donald J.  
 Mackintosh.
- From Charles Griffin and Co., London—  
 Atlas of Urinary Sediments.
- From Cassell and Company—  
 Orthopaedic Surgery. By J. Jackson Clarke, F.R.C.S.
- From the University Press—  
 The Illusion of Free Will and Criminal Responsibility. By  
 A Hamon.  
 "Darwin" on Trial at the Old Bailey. By Democritus.  
 The Pathology of Emotions. By Ch. Féré.
- From George Barber, London—  
 Handbook with Hints for the Nursery. By J. Maclean Carvell, M.R.C.S.
- From Adlard and Son, London—  
 King's College Hospital Reports. Vol. v.
- From John Wright and Co., Bristol—  
 Golden Rules of Psychiatry. By James Shaw, M.D.
- We have also to acknowledge the following—  
 Test Cards for Colour Blindness. H. Wohlleben, London.  
 Manual for the Church Lads Brigade.

\* \* \* Authors can have reprints of articles at the following rates :—

|                       |     |      |         |
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THE  
BIRMINGHAM MEDICAL REVIEW.

OCTOBER, 1899.

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ORIGINAL COMMUNICATIONS.

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THE TWO DISCIPLINES IN EDUCATION.

AN ADDRESS,  
DELIVERED AT THE OPENING OF THE MEDICAL SESSION,  
MASON UNIVERSITY COLLEGE, BIRMINGHAM,

BY SIR WILLIAM T. GAIRDNER, M.D., K.C.B., LL.D., F.R.S.,  
PROFESSOR OF MEDICINE IN THE UNIVERSITY OF GLASGOW.

NOT very many weeks ago, I had the opportunity of spending a long summer day in the country with a friend who, if I were to name him to you, would be recognised by many here as one of the foremost men, and one of the greatest authorities, in medical science; and along with this old friend, we had one of the very foremost physicians of the American continent, a guest for the day like myself, in a most beautiful country within easy hail of London, amid the downs of Surrey. The occasion was one which might have led to discussion of some of the points I intend dealing with in the present address. I do not remember that there was much, if any, discussion of that kind among us, and yet I have something like an instinct that you may take what I shall deliver to you as being substantially in harmony with the views and opinions of these eminent colleagues. One thing, however, I may here mention as having taken some hold upon my own mind, that of a life-long teacher



of medicine. This was a lecture given by our host, in the afternoon, to a mixed audience of all ages and ranks, within an "educational museum" that owes its existence in this sequestered village to the energy and restless fertility of resource that characterise my friend alike in his professional career and in his relaxations—if so they may be called. This lecture was one of several carried on at intervals during the summer and autumn, under the auspices of a local committee with whom the museum is vested as a trust. It goes without saying that the lecture was no common one—it could not have been so, considering the lecturer—but as it is with the method more than with the matter of the discourse that I am concerned at present, I will venture to use it as an illustration, without too many details. One thing, however, particularly struck me, in the very commencement of this altogether remarkable lecture. It had been announced that the first twenty minutes or half hour would be given to some common object or objects freshly provided, while the remainder of the discourse was to be upon "Whales." In this first portion the key note, as it were, was struck by presenting to an intelligent little maiden of perhaps twelve years old, sitting near the lecturer, a severed branch of a fir tree just imported from the adjoining woods, and asking her—"What is that brown object growing in the cleft of the branch there?" "A pine cone?" "No, it is not a pine cone, though it may look a little like it. You see it has some of the green leaves growing out of it. Now, take this knife, and cut what you supposed to be a cone down the middle." This cut being performed revealed an insect inhabiting the woody growth, and this led to a few minutes' discourse on these animal parasites, or galls, in their more general relations. Then followed an exhibition of potato blooms, so recently recovered in our fields after many years of almost entire absence; with some remarks on the possible causes of these changes; but, as I have said, the details of the lecture being of less consequence for my present purpose than the method of it, I will pass over what was said upon this subject. Interest being thus thoroughly aroused, alike among old

and young hearers, by this dealing with common objects, the main subject of the lecture as announced was proceeded with, and proved to be a most philosophical, though by no means too abstruse, discourse on dried specimens in the museum, of the structure of certain whales and their congeners, the dolphins, narwhals, etc., etc. ; following out the lessons to be derived from the modifications of the skeleton and the dental apparatus in different tribes of animals more or less resembling each other, as viewed in the light of Darwinian principles by a thorough and experienced student of nature. It was a lecture, which, from plain and simple, very visible and very tangible facts, presented in the first instance objectively (to use a comparatively modern philosophic word), extended up to very general and somewhat recondite laws of nature ; but above all, it was a lecture which had "Nature" for its groundwork and its basis, observation of Nature for its primary method ; and which thus tended to quicken, or educate, in an equal degree, the faculties of observation and those of reflection.

#### THE METHOD OF SCIENCE.

In the course of hearing this admirable exposition, and noting at the same time, the very vivid and unfeigned interest displayed in it by old and young alike, I was led into some considerations which were not by any means new to me (as you will presently find), but which I have since thought might be turned to account as a fitting basis for the present address. Observe, once more, that it is the method, and not the matter, of this teaching on which I desire your attention to be fixed, as students of medicine. It would be going too far, perhaps, to affirm that the method here in question is the exclusive method of medical science or of any other science. But it is, in a broad and general sense, the method of *Science*, as distinguished from *Literature* and *Philosophy*, which, in days not very long past, well-nigh monopolised the field of education, and seemed to many generations of our ancestors to comprehend, if not to exhaust, all the available faculties of the human mind. My desire is, not to disparage

literature and philosophy, much less to insist upon these, or any department of them, being supplanted by newer methods in education ; but to show that what I have already called the *objective* method has, and ought to have, a quite definite place in all education, from the infant school up to the University ; and that to refuse or deny to it this proper place is practically to arrest the growth of certain faculties which are at least as important in the evolution of an educated human being as are those which have for ages been subjected to the disciplinary methods commonly called scholastic, inasmuch as these methods have had almost the undisputed possession of the schools, and therefore of the minds trained in them. My argument will be, not that the scholastic discipline is bad of its kind, but that it is, or at least has been, defective ; not that its results, so far as attained, were otherwise than most important and valuable ; but that other results, which should have grown up side by side with these, and in perfectly harmonious association with them, have been artificially withheld and denied the opportunities of development which they might have had, and would have had in a complete and well-balanced educational system.

This complaint is not new. The late Professor Huxley, in the course of a long and busy life devoted in almost equal proportions to science and to controversy, omitted no opportunity of urging the claims in education of the kind of discipline here referred to ; and in his case the brilliancy of his own literary gift, and the luminous powers of exposition which he applied to certain philosophical topics, forbade the idea often—and perhaps in some cases justly—entertained of the mere scientist, that in the riding of his own hobby he would willingly ride over, or at least would be utterly careless of, everything else that came in the way. Moreover, in his lecture—"On a piece of Chalk"—Huxley has left to us a practical and outstanding illustration of the kind of wide scientific outlook that may be based even upon a very common object, and of the singular attractions which such an exposition may have—and ought to have—for all minds that have not been already fatally distorted by overmuch and

exclusive training in book-lore, and the merest pedantry of current educational systems. And almost, or quite a generation before Huxley, when, indeed, that brilliant and combative genius may have been (for aught I know) among the early entranced child-listeners at the Royal Institution, Michael Faraday was experimentally unfolding and expounding the "Chemistry of a Candle" to audiences which, although the simplicity of the treatment was such as to fascinate children in their Christmas holidays, and was in the first instance intended for them—came to include also many of the most gifted statesmen, philosophers, and adult persons of social eminence, in London.

FARADAY ON ENGLISH EDUCATION.

These lectures at the Royal Institution, by one who is confessedly one of the greatest scientific investigators of the present century, were probably responsible in some degree for the first effective protest against the one-sidedness of the scholastic methods as then pursued; for in 1855, Faraday (although with characteristic modesty he confessed himself to be "not an educated man") affirmed, in presence of Prince Albert and a large assembly of highly cultivated and socially notable persons, his clear conviction that the most highly educated minds in this country were often entirely undisciplined in the merest elements of the knowledge of *things* as opposed to *words* and abstract ideas, and that these minds, even in mature age, remained impermeable to truths which to one with any scientific discipline at all were all but axiomatic.

Faraday was not only assured by his own experience as a teacher that very young minds were open to receive, and ready in apprehending, the data and inferences resulting from well-conducted experiments, but he had also had before him the fact that in the most highly cultivated classes in English society persons were to be found on whom experimental and physical evidence failed to make any impression at all, when brought into contact with an *a priori* conviction, however foolish and absurd. The crude impostures of table-turning, spirit-rapping,

and other quasi-supernatural manifestations were at this period in full flow of their fashionable popularity; and Faraday, who was, withal, a man of the most sincere and profound religious faith, maintained without hesitation that these materialistic communications, alleged to be from the spirit-world, were, as such, wholly unreal and misleading. As regards some of them, he proved to demonstration, by physical experiments of a remarkably simple kind, that this was so. But still the great world, and the fashionable world of society went on believing, and furnishing converts to wholly exploded fallacies. Faraday was thus led to the conviction that there was a grave deficiency in the scholastic discipline of very high-born and distinguished Englishmen in his day; and in 1862 he obtained the opportunity of explaining and impressing this opinion more at large before the Public Schools Commission of that date.

When addressing the British Medical Association from the President's Chair, in Glasgow, in 1888,\* with special reference to the demands of medical education, I had occasion to cite this testimony of Faraday at some length, with the view of showing that although some response had even then been made to his modest representations, supported as they were generally by the Public Schools Commission already referred to, and still further by a later Commission on Scientific Instruction in Public and Endowed Schools in 1875, there was still much to be done before the lessons read to the first of these Royal Commissions by this great master in science could be said to have had their just effect. Faraday was himself fully aware of the difficulties, and even dangers, of prematurely urging, or rather forcing, the claims of science-teaching; and no one could be less open than he to the reproach of having made revolutionary proposals in favour of science, to the detriment of the older and more established scholastic discipline. Others were no doubt much more impulsive, or less restrained, or less unwilling than he was, speaking always as he did in the character of one who was "not

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\* "The Physician as Naturalist." Glasgow. James Maclehose & Sons, 1889. Also in *British Medical Journal*, 11th August, 1898.

an educated man," to carry war into the camp of the humanists. In the admirable "Romanes Lecture" recently published by my former colleague, Professor Jebb,\* I find generally that the sixties—*i.e.*, the years immediately following the report of the Public Schools Commission—are referred to as being the critical moment, "a moment in this century when the attack upon the humanities was somewhat formidable." It is very satisfactory to note that, as the result of his whole investigation of the subject, Professor Jebb considers that the humanities have successfully weathered this storm, and are now, towards the close of the century, in a stronger and more secure position than they were before. "In the sixties," he writes (p. 35), "considering the strength of the attack both from without and from within, the position of humane studies was certainly more seriously imperilled than it had ever been before. . . . The danger was lest the powerful alliance between insurgent men of science and disaffected humanists, aided by the legions of Philistia, should force on a movement for imposing restrictions in a spirit altogether favourable to the new studies, but unfriendly to the old; with the result that classical studies might be so narrowed, so hampered, so maimed, as to lose nearly all their educational virtue: and, after languishing for a time, might gradually die out of the schools."

The other side of the question is stated not less candidly, though not, perhaps, with the same fulness of knowledge as regards scientific results and methods, by Professor Jebb, as follows (p. 37):—

"In the last thirty years the position of the humane letters, relatively to other studies, has been altered in several important respects. The study of the natural sciences is now firmly established in schools and universities; it can no longer be said that a haughty and exclusive humanism keeps them out of the educational field; indeed, there are not a few seats of learning where they hold a clear predominance. . . . This establishment of the modern studies is, so far as I have seen, viewed by

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\* *Humanism in Education.* By R. C. Jebb, Litt. D., Hon. D.C.L. Macmillan and Co. 1899.

humanists generally with cordial satisfaction. The spirit of humanism, indeed, wherever it is not a narrow pedantry, is one which welcomes every accession to the domain of sound knowledge. Meanwhile, the claims of humanism itself, sifted by a period of controversy, and illustrated by larger views of liberal education, which now prevail, are usually stated with more discrimination than formerly, and are more willingly and more widely acknowledged."

THE "ATTACK" ON HUMANISM IN THE SIXTIES.

This is surely a very satisfactory result, so far, of a controversy in which, as I have all along held and maintained, the two parties that have appeared as jealous rivals in the educational field, ought in reality to have been the best of friends; inasmuch as each of them was pursuing an end quite necessary in itself, and one which, rightly understood, so far from excluding, or being incongruous with the other, ought rather to have been considered as giving it the support and assistance required in working out a common purpose—the all-round evolution, or education, of the faculties of the human mind. But I am by no means convinced that the "attack" (to use Professor Jebb's expression) on humanism, which is attributable to the introduction of the methods of natural science into education, has by any means exhausted itself, even now. All the more, therefore, I am grateful to the Romanes lecturer for making it clear to me and to all men that the danger which was so seriously apprehended in the sixties, has been averted, or (as I should put it) shown to be really no danger at all; and that everything in humanism that is most of its essence, and therefore of most abiding value, has not only survived this "attack," but has become stronger and more broadly and truly human, through the trials to which it has been exposed. Partly by getting rid of certain pedantic and deeply engrained defects of method, and partly by the development of quite new kinds of interest in the old and traditional studies, the classical and other pursuits which constitute humanism have been strengthened, rather than weakened, by the intrusion

of the new or more modern elements in education. As Professor Jebb himself puts it (p. 34) "the humanistic studies have, during this century, become wider and more real. They have gradually been drawn out of a scholastic isolation, and have been brought more and more into the general current of intellectual and literary interests. So far from losing strength or efficiency by ceasing to hold that more exclusive position which they occupied two or three centuries ago, they have acquired a fresh vigour, a larger sphere of genuine activity, and a place in the higher education which is more secure, because the acceptance on which it rests is more intelligent."

DANTE—PETRARCH—ERASMUS. THE ITALIAN RENAISSANCE.

It would be very unbecoming in me to attempt to add anything now to the force of these words, carefully set down as the result of a life-time of experience and research by perhaps the greatest of our living humanists, a friend and (I am glad to recall the fact) an ex-colleague of my own in the University of Glasgow. But I may be permitted to remark that this hopeful and tolerant attitude of mind, towards the changes in our educational policy that have been gradually taking place since the early sixties, has been by no means universal; and that the admission of the new methods and new forces of scientific training into our educational system has been very grudgingly, and often inadequately conceded by those who, themselves trained on the older lines, and being officially masters of the situation, have treated all innovations as hostile, and their authors as enemies to culture instead of friends in disguise. Perhaps there may also have been a spirit of undue aggression and even contempt on the other side, among those who have written and spoken as if the so-called "modern" studies were all-in-all in this nineteenth century of ours. To such over-zealous partisans the *apologia* of Professor Jebb may be commended, as a temperate, careful, and I need scarcely say thoroughly well-informed historical and argumentative statement of the claims of "Humanism in Education." He attributes to Petrarch the honour of being the



pioneer in "that great movement which we call the Renaissance." Dante, who was thirty-nine years old when Petrarch was born in 1304, was the last great (and perhaps the greatest) figure of the middle age "standing in the borderland between the darker ages and the revival, when he shows us a keen intellect and a sublime imagination moving within the limits, and obedient to the forms of mediæval thought." "At the further verge of the Renaissance" (and at quite two centuries distance from Dante) we have "Erasmus, the life-long antagonist of the schoolmen, who makes so vivid to us the contrast between the intellectual atmosphere of scholasticism and that which the humane letters had created" (p. 6). And in these two centuries no one surely, will now attempt to deny that the human mind awoke as from a slumber, and entered on a new course of life and activity, as a consequence of the Italian revival in the 14th century. "Petrarch's ideal of humanism," says Professor Jebb (p. 7) "as a discipline which aims at drawing out all the mental and moral faculties of man, pervades the whole course of the Italian Renaissance."

That this ideal was not always attained; that it was "often obscured by affectations or puerilities," and "not seldom belied by evil living"—a kind of revived Paganism, in short—Professor Jebb frankly admits. But, all the same, it was "a real force, which comes out more or less in all the greater and nobler of the humanists." To all this, considered as the history of a great movement which began more than five hundred years ago, and has had an abiding influence on the educational methods of all European countries, one can readily assent, while maintaining, with Faraday, Huxley, and all the great scientific authorities of the present century, that the discipline of humanism requires now to be supplemented by a newer and different discipline; and this, not merely, and not chiefly, on account of the utilitarian value of the latter, but in obedience to the very principle attributed to Petrarch, that education, in the large and liberal sense of the word, should be such as to "draw out all the mental and moral faculties of man."

It is with a view to this distinction, that I have ventured to give this Address the title of "The Two Disciplines," and I hope to show you, before I have done, that without at all disparaging the first, or older discipline, that of the Renaissance, commonly called Humanism ; the second, which finds its objects in the physical facts of nature, and its methods, generally, in those of what we call physical and natural science, must be firmly upheld and pressed home, until it permeates every phase of education, as I said before, from the Kindergarten School up to the University.

WHAT THE RENAISSANCE FAILED TO DO.

The great men of the Italian Renaissance, owing to the very fact that they were so exclusively and completely preoccupied by the revival of learning, and mainly of classical learning, could not be expected to perceive that learning, even if we include in it philosophy as well as literature, and mathematics as well as philosophy, does not by any means exhaust the cycle of human faculty. It would have been indeed marvellous if, in an age when astronomical science, founded in genuine and on the whole exact observation of nature thousands of years ago in Chaldæa, and methodised (though erroneously) by Ptolemy, had degenerated into astrology ; when chemistry (whatever there may have been of it) had passed into the visionary search for the philosopher's stone and the elixir of life ; when biology, pursued at least on a large basis of observation by Aristotle, had become absolutely inept, and a mere repetition of verbiage attributed, and often ignorantly attributed, to the ancients ; when anatomy, founded at least on something like personal observation in Galen's time, and carefully pursued by Erasistratus and others in the Alexandrian school, had altogether perished, and was, indeed, forbidden by authority ; and when the science and art of medicine, so necessary at all times for the preservation of life and health, had become a mere craft, with such learned equipment as we read of as Chaucer's "Doctour of Physike ;"—in such an age as this, it would have been more than human if the pioneers of the Renaissance had ever thought of placing the discipline of science, or of

any kind of observation of nature, upon their programme of an all-round education of human faculty. In their revival of classical learning, they had the support and patronage of popes and of Medicean princes, even when the trend of the new studies seemed to be in the direction of sheer paganism alike of thought and of life. It was safe enough to denounce, or to ridicule, the pseudo-sciences of the time ; and this (according to Professor Jebb) the humanists did, and did effectually, especially as regards astrology ; for "from Petrarch onwards" he says (p. 15) they "made open war on this flourishing imposture." But the discipline of true science (or of natural and physical phenomena) was a very different thing from this negative attitude towards its counterfeits ; which may, however, be placed to the credit of the humanists. From no pope or Medicean patron in those days could any effectual assistance have been expected, either in genuine and fruitful investigations of the *arcana naturae*, or in teaching the methods of "science" as we now understand them. The fate of Roger Bacon, in the century immediately preceding Petrarch, and of Copernicus and Galileo later on, remain for us as standing monuments at once of the dangers that waited upon the pursuit of physical science in mediaeval times, and of the small share that the movement called the Renaissance can claim in advancing these pursuits to a place in the education of humanity.

#### A NOTABLE PHRASE OF J. C. SCALIGER.

There was, however, at least one humanist, of the latter period of the Renaissance, who by a single brief epigrammatic phrase, has managed to shew that he, at all events, was not wholly insensible to the value of a discipline such as Faraday advocated and practised, and such as we are now considering in this address. The Scaligers, though they bear a name of distinction, were not, perhaps, in the front ranks of the humanists, and certainly did not do very much, in their day, for the advance of science. But the elder of the two, Julius Cæsar Scaliger, was trained as a physician, and I believe, practised as a physician ; and in writing to another and perhaps more eminent physician,

Jerome Cardan, somewhere about the year 1557, in the course of a long, desultory, and somewhat unreadable dissertation\* "De Subtilitate" he has formulated the following very notable phrase, pointing, as he seems to think, to something wanted in the educational tendencies of his time. The special subject in view is Rock Alum, and the fallacies current in respect to it; and I am certainly not here to allege that the reflections of Julius Cæsar Scaliger on Rock Alum have any kind of resemblance to those of Mr. Huxley "On a Piece of Chalk." But it is something, surely, to have compressed into seven brief words of Latin an idea so foreign to the humanism of the Renaissance as the following:—*Rerum ipsarum cognitio vera e rebus ipsis*. If Julius Cæsar Scaliger had been Michael Faraday, and if he had lived in the nineteenth century instead of the sixteenth, he could hardly have given a more complete and condensed expression than we find in these words to the defect in the purely humanistic programme of education on which Faraday so strongly insists in his evidence before the Royal Commission in 1862. What Faraday deplored as being defective in the most highly educated Englishmen of his day was the knowledge of *things* as opposed to *words and abstract ideas of things*—or, in the phrase of Scaliger a true cognition of the things (or objects) themselves, taken directly from the things themselves. The argument of the highly-educated grammarian of the 16th century was that the want of this direct knowledge of things led to some curiously distorted views about rock alum and many other natural phenomena. The contention of the "uneducated" philosopher of the 19th century was that the "want of judgment in natural things," and the "great deficiency in the power of giving the reason why" were such among the educated class as often to defeat the ends of justice in courts of law, and to lead to the most humiliating exposures of confident ignorance and presumption in matters of fact; and all this in the

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\* *Exotericorum Exercitationum Liber xv. de Subtilitate Exerc. 104. Sec. 6, "de Alumine Rochæ."* I quote from the edition of Francof. 1612; but there are various editions from 1557 onwards.

case of persons who had received every advantage, and who, in all kinds of learning and in the discipline then provided in the schools, stood in the front rank of Englishmen. And here it was, that the almost unique experience of Faraday—unique at least at that time—came to his aid; for he had found personally, in the course of his lectures in the Royal Institution, that the elementary ideas of the “judgment in natural things” were not only easily conveyed into the minds of children, but had a peculiar fascination for them. “The young mind,” he says, “as I find it . . . is very observant and asks most acute questions. I do not find it, generally speaking, backward to understand a statement I make in simple language; and if I tell him this or that . . . and then shape it into a question, he can generally answer me. I must confess to you that I find the grown-up mind coming back to me with the same questions over and over again. . . . Their minds are not prepared to receive or to embody these notions, and that is where you want education; to teach them the A B C of these things. . . . I never yet found a boy,” he says in another place, “who was not able to understand by simple explanation and to enjoy the point of an experiment.”

I am repeating, Gentlemen, in these quotations from Faraday’s evidence, and in some of the remarks attached to them, the very words that formed part of my Address to the British Medical Association in 1888. But I think you will concede to me that the words are worth repeating. Here is a master in science, if ever there was one; but one who, nevertheless, proclaims himself “not an educated man” according to the conventional views of education in this country. He does not, however, express any resentment at the current discipline, or any desire to attack or destroy it. “I should be very sorry,” he says, and evidently with conviction, “that the introduction of science should be an injury to any other branch of knowledge.” All the same, however, he insists with the confidence of one who thoroughly knows what he is speaking about, on the disastrous effects of an omission which he finds in the highest and most

coveted English disciplines of his own day. And this omission is practically identical with that foreshadowed by the man of the Renaissance, Julius Cæsar Scaliger, in 1559—*Rerum ipsarum cognitio vera e rebus ipsis*.

THE TWO DISCIPLINES CONTRASTED.

In thus insisting on this old and half-forgotten expression, I do so not because it had any considerable effect at the time, or because it had much apparent significance in relation to the career either of Scaliger or his correspondent Cardan; but because it formulates for us now more exactly and more briefly than any other words I can devise, the kind of discipline and method which in the commencement of this address I had it in view to illustrate, and which it was Faraday's object to introduce more largely into education. The essential difference of the "Two Disciplines" (as I have ventured to call them by way of contrast) is that one is based upon ideas which have already received expression in human speech; while the other is concerned chiefly with objects, that is, with phenomena occurring in external nature. The former discipline accordingly is (whatever else) necessarily preceded by and mainly founded on linguistic studies, and keeps close to them throughout, inasmuch as language is not only the vehicle of ideas, in respect of their intercommunication; but (as Max Müller has so cleverly put it) the λόγος is at once the word and the thought; the one being in a practical sense inseparable from the other. Hence the trend of this discipline is towards *humanism*, i.e., towards the discovery and highly elaborated study of the best models and examples alike of thought and of expression; the noblest and most inspired ideas of the most outstanding men, clothed in the most appropriate and (if it may be so) beautiful, but at all events fitting and luminous, words. The men of the Renaissance found this kind of perfection in the literatures of Greece and of Rome, and directed all their energies to the revival of these, and to living over again, and thinking over again, the best ideas of classic antiquity. Nor is there anything to be said against

this noble humanistic ideal, as it presented itself to Petrarch in the 14th, or to Professor Jebb in the 19th century, except what the latter, indeed frankly admits. Humanism may be "obscured by affectations or puerilities," it may be "belied by evil living," founded on the too admiring familiarity with Pagan practices and habits of thought; or it may, as a discipline, become much too technical—as sometimes in its grammatical developments, to be a good all-round education, even for a humanist. For, as we read in the Romanes Lecture (p. 27), "the modern specialist in certain branches of classical study, may come perilously near to passing out of the province of humanism."

"LOGOS" AND "PHUSIS."

Such, then, are the leading characteristics of what we may call, historically, the older and, until recently, paramount scholastic discipline, founded mainly on language, and including in its widest range philosophy and mathematics, which are also, as studies, only to be compassed through verbal symbols and definitions underlying their whole argument. This discipline begins in the individual man with the actual A B C, or rather with the first spoken words of the child, and is methodised and expanded in the school and university either into humanism of the classic and renaissance type, or into some other variety of literary and philosophic evolution founded on this, but more largely permeated by modern ideas. Having in view the contrast I am about to present to you, and also the large and comprehensive interpretation placed upon the word by Max Müller, I am disposed to indicate the whole of this discipline in one Greek word, and call it the discipline of *λόγος*.

But now let us revert for a moment to the other discipline, which occupied our attention in the beginning of this address—and which, instead of calling it by the ambitious title of the discipline of science (although it deserves to be so-called) I prefer now to consider under its simpler and more universal aspects, as the discipline of *φύσις*, i.e. of nature

and natural phenomena. I have already employed this expression for it in my former address, and have had occasion to point out that by a very ancient tradition embodied in the name *physician*, the medical art and its professors of the higher order have been all along supposed (sometimes it is to be feared erroneously) to be specially imbued with this discipline, or at least to have a quite special interest in it as the only fruitful method of medical science. It is, moreover, true at least of Hippocrates, the Father of Greek medicine, that he anticipated by some two thousand years the well-known expression of Francis Bacon, by indicating the true position of the healer as being *ὑπηρέτης φύσεως*—the servant (or minister) of nature. And, if further evidence were required, the very foundations of what we now call Biology, pursued in relation to the art of healing, came to be spoken of at a very ancient date as Physiology—the doctrine, or *λόγος* of *φύσις*—a designation which it has retained till our own day. There is thus a reasonably good traditional ground for the position in which we stand to-day—in this flourishing medical school of a nascent University—pleading for the more ample recognition of the discipline of *φύσις*, in relation to general education.

It is perhaps worthy of note here, that in the natural order of evolution of human faculty as regards the individual, the discipline of *φύσις* is first, that of *λόγος* second. The latter commences with the first words spoken or apprehended by the infant, followed up in time by the A B C. But the A B C of *φύσις* begins in the cradle, in the very first hours of conscious life. The whole existence of the infant is a discipline—sometimes a painful, oftener a joyous one, in the wide school of natural phenomena. His very primordial instincts, the play of hands and feet and lungs and voice, tutored and guided by experience, are a part of that natural discipline. To learn that fire burns, and that water cools and cleanses; that iron is hard and heavy, while wool is soft and light; that colours, sounds, tastes, and smells differ, and may mean good or evil, help or hindrance, in particular circumstances; these are the first steps



in the discipline of *φύσις*, and are learned, as a rule, with great ease and confidence, though not without mistakes, from experience, long before the A B C of the other discipline has begun to be thought of. In the admirable kindergarten schools of recent times, moreover, the discipline of *φύσις* is often attended to and aided by well-contrived efforts and experiments, increasing both knowledge and power without any sense of task-work, or fatigue of body or mind, and with the clearest proof of enjoyment on the part of the child. But, so soon as the discipline of *λόγος* comes in, monopolising the attention and making drafts upon the intellect in the shape of memory and task-work, the more natural discipline is apt to be thrown aside or even severely repressed, as being unprofitable in a scholastic sense. At the very least, it fails to be methodised and expanded, and is not turned to account either in a scientific or any other direction, as the discipline of *λόγος* is when it carries off all the tangible rewards, and in fact becomes exclusively what is called "education" on the lines of humanism, as we have just seen.

Fortunately for the human race, however, the discipline of *φύσις* is not confined to the schoolroom. The fisher learns a good deal of it in this commonest of sports in studying the habits of the *salmo fario*, or even of the minnows in the pool in childhood, and does not dignify what is so learned with the name of "science." The child addicted to bird-nesting, the collector of flowers, or of insects, of seaweeds, or any other natural productions, acquires a hold thereby upon one or other corner of abounding "Nature," which may or may not be wisely cultivated. In every kind of sport, in almost every occupation pursued in the country, *φύσις* will have her votaries and, up to a certain point, her successful students. A Gilbert White will indulge to the full his wonderful instinct for the observation of nature even in a quiet country parsonage, and will give us the "Natural History of Selborne." A Hugh Miller of Cromarty, combining a fine literary instinct for "humanism" with native scientific genius, will tell you years afterwards that the best part of his early education at the parish school was on the days when he "played the kip"

*i.e.* the truant, and devoted himself to long walks, taking in slowly the lessons which afterwards came out in "The Old Red Sandstone," and "The Testimony of the Rocks." But such brilliant aberrations of scholastic discipline only bring to mind the old Latin proverb—*Naturam expellas furcâ tamen usque recurret*. Faraday's principle is that the great natural aptitude which most boys display for observation and experiment ought to be fostered, and not hampered, in a general scheme of education. No doubt, the more recondite and abstruse generalisations of "science"—especially those which involve mathematical considerations—are beyond the scope of most boys at school, as they are of most men even at a later period. But that is no reason for rejecting the discipline that arises from much more simple and easy demonstrations of φύσις. The lectures "On the Chemistry of a Candle" were of this description, and they have been published. They were intended to shew, and did shew, that most important scientific generalisations, resulting from experiment, and actually demonstrated in presence of a juvenile audience, could be made perfectly clear to the minds of school-children, if presented in simple language by one who was a master in the subject.

FARADAY'S DIFFICULTY—TO FIND THE TEACHERS.

It was at this point, however, that Faraday did not fail to foresee a difficulty which is even now, perhaps, not unlikely to endure for some time to come. Where are the masters to come from? In his own days he said, "I am often asked what men to recommend to spread a knowledge of natural physical things. I cannot recommend such; such men hardly exist at present. They want the A B C of science, not the X Y Z; they want the first elements." Faraday was well aware that a mere scheme for teaching "science" among a lot of what are commonly called "modern subjects" would not work. "It is not the matter," he said, "it is not the subject so much as the man. You want men who can teach (science) and that class has to be created." Faraday knew well (though he did not put it exactly in these

words) that "science" (so-called) might be taught out of a text-book, by rote, like anything else, and in such a way as not to have the smallest relation to the discipline of φύσις. The one essential point in that discipline, as distinguished from that of λόγος, is that the teaching must be real of its kind, founded on experiment and observation directly, and not doctrinal. It must be, in short, *rerum ipsarum cognitio vera e rebus ipsis*.

Now in the actual teaching of a medical school in these days, gentlemen, we do our very best to make this kind of teaching yours as far as we can. You are taken into the dissecting-room and are expected to learn for yourselves (with assistance of course)—to make yourselves practically familiar with the anatomy of the human body by the work of your own hands and senses. You have to undergo a similar discipline in the chemical and physical laboratory, and again in the physiological, and again in the pathological laboratories, and in many others. In the great practical departments, you have your clinical work in the hospitals, which, if well managed by competent men, ought to be all a part of the discipline of φύσις and nothing else. A certain amount of dogmatic instruction by lectures and text-books, it is true, is absolutely indispensable, and I am not here to disparage it, as I have long practised it myself, and have fully discussed elsewhere the need that still exists for it \*. But every systematic teacher of any eminence or effectiveness will tell you, that if he were deprived of his practical service, his teaching, even as a systematic and more or less doctrinal lecturer, would inevitably degenerate. Here again, therefore—*rerum ipsarum cognitio vera e rebus ipsis*—is the true note of the discipline of φύσις. If general doctrines and conclusions must needs be taught, they should be taught as much as possible in the light of instances; and the

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\* Two Lectures. I. Lectures, Books, and Practical Teaching. II. Clinical Instruction. University of Glasgow, Session 1877-78. [The first of these Lectures was printed in part in *The Lancet*, November 17th, 1877. The second has been mostly used for distribution to my clinical classes, as an exposition of the method to be pursued. Both Lectures are now out of print.]

more these can be freshly provided and brought before the senses of the learner, the better.

But the question which I am here to discuss to-day, though it is one of medical education, is also one of general education as this will, I trust, come to be largely moulded and dominated by the Midland University of the future. Would not medical education be greatly improved, and rendered easier as well as better in quality, if the well-nigh lost discipline of *φύσις* were to be restored, in some appreciable measure, to the "grammar school?" Nay, would not the discipline of letters itself be improved, were it to become a fundamental principle in all education, from first to last, that *λόγος* and *φύσις* should go hand in hand, each of them, of course, in a measure suitable to the advancing intellect and general growth in faculty of the child or adolescent? My argument is that this ideal, though perhaps difficult of complete attainment now, and for some time to come, is not impossible, nor yet in any true sense injurious to the older discipline. I take it on the authority of Professor Jebb that the "attack" on "Humanism in Education" in the sixties has not been really disadvantageous to the latter, but rather, by purging humanistic studies of pedantic excrescences and methods, by drawing them out of a scholastic isolation, and bringing them more into the general current of intellectual and literary interests, has actually strengthened their position by making them "wider and more real." Now, if all this be true as regards the higher education, why should not the same principles, and with a like result, prevail also in the grammar school? Observe that I purposely avoid the use of the words "science" or "scientific teaching" here, because we may be dealing (as Faraday said) only with the A B C, and not with the X Y Z; and further, because "science" may be crammed out of a text book after a fashion that makes it no more a discipline in *φύσις*, than are the rules of prosody, or the genders of Latin nouns, or the declination of Greek irregular verbs. But when the proper kind of teachers can be obtained (and that is the greatest difficulty now, as it was in Faraday's time) the

discipline of φύσις will make as great and as beneficent a change in the grammar school as it has already, in part, done in the Universities and seats of the higher and more advanced learning.

On this point I find little to alter in the language I employed in 1888, a few sentences of which you will perhaps excuse me for repeating, as I cannot find any other or better terms now for expressing the changes which I have in view. "Our present programme of school discipline is still too largely founded on the idea that at six or seven years old, as the case may be, a child may be withdrawn, in a great measure, from this strictly natural, wholesome, and all-round education of the faculties (*i.e.*, that of babyhood and of the kindergarten school), to have his nose buried for ten long years in books and papers, and mental and other arithmetic, till his little eyes become myopic, and his little brain suffers a corresponding deformity. Athletic sports, as a counterpoise, are no doubt good, and industrial training better, in some cases, especially among the children of the poor; but they do not supply the missing link, which can only be found in the early discipline of φύσις, pursued in the very spirit of Faraday." To which I should only wish now to add, in parting with that great man on the present occasion, a few words from his evidence on this very point, in reply to a question as to what he thought of the ordinary grammar school discipline in this respect. "It does not blunt the mind," he said, "but it gives the growing mind a certain habit, a certain willingness to accept general ideas of a literary kind, and to say that all the rest is nonsense. . . . It takes up the general impression that a certain kind of knowledge, what I call the real knowledge, the knowledge of things, is of no importance."

#### A QUESTION FOR THE GENERAL MEDICAL COUNCIL.

I will close with a single remark, which may have the effect, considering that my audience is chiefly concerned with medical education, of showing you that the higher orders of schools are, even now, awakening to the demands that may be made upon them

in this respect ; and that some, at least, of the medical examining bodies are not indisposed to encourage this movement in advance. I was obliged to separate myself at the last meeting of the General Medical Council from (I believe) all, or most, of my Scottish and Irish friends, and to vote in a minority with the representatives of the English Corporations. The occasion was this. You are aware that the medical curriculum has been, within the last decade, extended to five years ; and even with this extension, it is still overcrowded and likely to become more so as the demand for special practical subjects, to be included in the curriculum, increases. Now, Mr. Huxley many years ago suggested, in the interest of course of scientific education as he conceived it, that the strictly medical training of the university and medical school proper might be lightened by getting some of the early discipline, in elementary physics, chemistry, and biology into the schools, to be pursued side by side with the more ordinary scholastic discipline, before the usual age of commencing strictly medical studies. Although this suggestion was not taken up at the time, at least to any very appreciable extent, it now appears that a good many English schools of the higher kind have, by engaging science masters, and providing sufficient laboratories and apparatus, been placing themselves in a position to claim that this kind of instruction may be communicated to their pupils to such an extent as to enable them to pass either the whole or some portion of the first professional examination. The English Colleges therefore determined to recognise, after due investigation, such schools as appeared to them to be capable of giving, or rather to be actually giving, such instruction as is real and valuable in these subjects. The Irish Colleges, on the other hand, objected to this new departure, on the ground, apparently, that "grammar schools" are not, and should be practically debarred from becoming, schools of "science" in any such sense as should form part of a medical curriculum. Observe, that it is conceded on all hands that five complete years after registration as a medical student, must be devoted to professional studies conducted at a medical school. The

attempt, therefore, to anticipate by a year the acquisition of some of this preliminary discipline does not in any way encroach on the time or attention to be given to more strictly medical or technical studies; but rather, by clearing the way for these in advance, permits the years passed at the medical centre to be more fully occupied by the studies proper to the medical art. I am far from assuming that no errors have been committed, or that there is not a good deal to be said on both sides; but from what I have already laid before you in this discourse, you will be prepared for the statement that I could not approve of anything that would tend to discourage the teaching of elementary science in English schools; and on this ground I voted with the minority on this occasion. I think the future is with the English colleges in this matter, and I trust they will persevere.

I have now only, Gentlemen, to congratulate you on your appearance in a school so well furnished in all its departments as Mason College, with whose origin and early progress one of my oldest friends, the late Dr. Heslop, was so closely associated that my interest in it may be said to date back to a period when I was still an Edinburgh man, an extra-academical teacher and hospital physician, and not a Glasgow University professor. I most cordially hope, for you, that the great scheme of a Midland University with which this school is ever to be associated, may be successfully carried out; and meanwhile, I would join in the welcome extended to you by all your teachers, and in the anticipation of a prosperous and successful session.

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## THE ADVANCE OF BACTERIOLOGICAL SCIENCE IN THE DIAGNOSIS AND PREVENTION OF DISEASE.

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THE retrospect of the history of this College is interesting from many points of view, and from none more so than from the side of its striking progress and advancement. Its expansion has been worthy alike of this great city in which it found its birth and has received its nurture, and of the great empire of England among whose academic institutions it has already gained for itself no mean place. The foundation of this chair of Pathology and Bacteriology, which the Council of the College have done me the honour of electing me to fill, is one of the most recent signs of this progress of which I speak; but although the chair is practically new and marks a very decided and important step forward, yet it should be noted that the teaching of the subjects which it professes does not begin in this College to-day. Much good work in both of its branches has already been done by the able men who, as teachers of Pathology, have preceded me here, and by others connected with this medical school who have been called upon to work in and teach pathological science at some period of their professional career. Some of this work has already borne good fruit, which has proved of value in the elucidation and alleviation of human disease and suffering. It is a source of great satisfaction to me to think that I shall have in my work here the great advantages of the co-operation of some at least of those able men as colleagues in this young and vigorous, and soon to be, I hope, highly successful and flourishing university.

"You go to teach a go-a-head science in a go-a-head place,"



was the remark of a friend to me the other day. This is unconventional language, but it is terse and true. It hardly applies to Pathology in general with the same force which it does to its handmaiden Bacteriology. The former is old and has less room in which to make advances, the latter is young and possesses vast unexplored territories. Bacteriology and Birmingham, though now closely knit together in friendship, are not of equal age. At the beginning of this glorious era of our good and gracious Queen's reign, Birmingham was already a city of considerable size and influence, while Bacteriology was yet an unborn babe, not to see the light for fully thirty years thereafter. To-day, however, both are giants. Both have recently shown a rapidity of growth and vigour of development such as human experience has rarely known, and both hold out immense prospect and promise of future great achievements. Birmingham supplies the world with its best and most deadly of small arms, but they do not surpass those which Bacteriology supplies to disease either in precision or fatality. In this fortuitous emulation of these two conquerors, the city and the science, I will not run the risk of deciding who has so far won. If the phrase pathology and bacteriology as applied to the science of disease be accurate, you can draw your own conclusions, for we do not yet say England and Birmingham when we refer to this country. Everyone thinks that he knows something about Bacteriology, especially when the more homely name of germs is used, but few outside the pale of the medical profession claim to know anything about Pathology. Even the medical man himself harbours not a few fallacies about it. It is so much associated in his student-mind with *post-mortems* and dead tissues that he comes to look upon it as chiefly coming in when life has gone out. There could be no more grievous error. It has really nothing to do with death. It leaves that to its confrères Medicine and Surgery! It deals only with disease and disease is essentially a phenomenon of life. There can be no disease in a dead body. It is only its results that are there. Pathology is therefore concerned with morbid processes, which take their origin

and run their course within the living body. Bacteriology is but its offspring and its various facts and phenomena, theories and speculations can be completely appreciated and properly appraised only by the trained pathologist. It is true that there are now many well equipped Bacteriologists, highly skilled in technique, experimentation, and other divisions of this many-sided science, who are not pathologists. They are simply limited specialists, who cannot so well as the Pathologist widely grasp, rightly weigh and balance, digest and estimate the truths and the teachings of the science as a whole.

It is some of the more recent and important of these that I wish you to consider with me to-day. The accurate recognition of the true nature of any disease is all important in relation to its treatment and prevention, and no science has won greater victories or secured more brilliant triumphs in any field of labour, than Bacteriology has gained in this. Great as its achievements have been in the past, there is every promise that they will be greater still in the future.

#### THE PRODUCTION OF DISEASE.

In order to properly understand the facts which I am now going to place before you, it will be necessary to refer shortly to the role played by bacteria in the production of disease. Disease is caused by the multiplication of the living organisms in the tissues and by the production therein of poisonous products, conveniently referred to as toxins. The latter are the chief if not the only efficient factors in the great majority of cases.

#### THE PRODUCTION OF TOXINES.

Few substances have received the attention that has been bestowed upon these products by scientists, and so complex have they proved to be, so subtle and intricate in their reactions, that we still remain much in the dark concerning them. We have not so far been let into the secret either of their production or of their exact composition. We know that they are produced by the bacteria, but we do not know how. It is obvious however, that their production may be accomplished in a variety of

ways, and we are not without evidence apparently supporting them all. *Vide* Fig. 1. We have first the supposition that they are formed within the protoplasmic bodies of the bacteria themselves, *i.e.*, intracellular, and either capable of being excreted in a modified or unmodified form, or incapable of being so excreted, requiring to be retained within the bacteria during their life time, and only being set free at their corporal death and disintegration. In the course of any disease a considerable quantity of any such toxins would naturally be set free, as large numbers of the germs are always dying. We have next the supposition that the toxins are formed not within the protoplasmic bodies of the bacteria, but outside them, in the fluids and tissues in which they lie, as the result of the changes which occur therein through the germs living upon them, *i.e.*, that they are of extracellular formation. For instance, if a culture of a bacterium, say diphtheria, in bouillon be filtered through a porcelain filter, the germ free filtrate will, if certain precautions have been observed, be found to be highly toxic and able on injection into an animal to produce the symptoms characteristic of the disease. These toxic properties may have been acquired by the bouillon as the result of the bacteria living upon its constituents or as the result of direct excretion by the bacteria themselves; or further, the first substances produced may be of the nature of ferments, small in amount and powerless of themselves to do much harm, but capable of great after-effect in virtue of their digestive action, which when fully established comes to confer upon the fluid in which they are present toxic properties of great power. It is therefore apparent that we cannot draw any hard and fast line between intra- and extra-cellular toxins. In individual instances one or other method of formation may be predominant, but in many they may be combined. Further, more than one toxin may be formed by any one bacterium, or it may be that the particular toxin formed by any bacterium, is so complex and so unstable that it readily breaks up into bodies varying very much from one another, especially under different conditions of formation. We must, for instance, carefully refrain

FIG. 1.

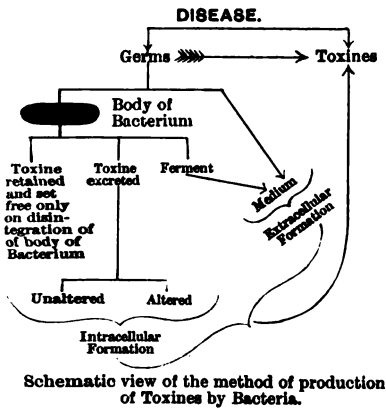


FIG. 2.

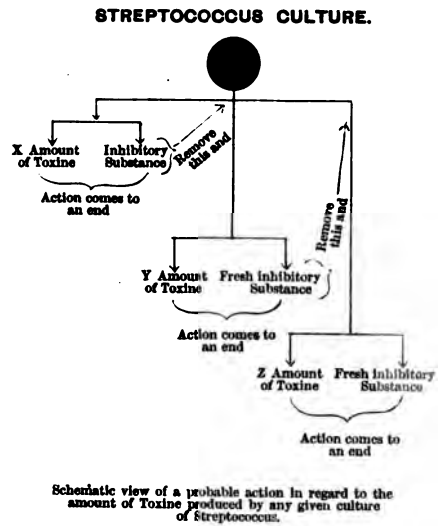


FIG. 3.

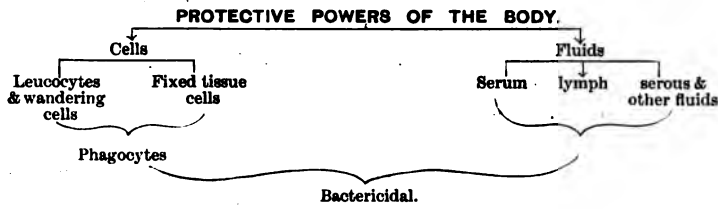


FIG. 4.

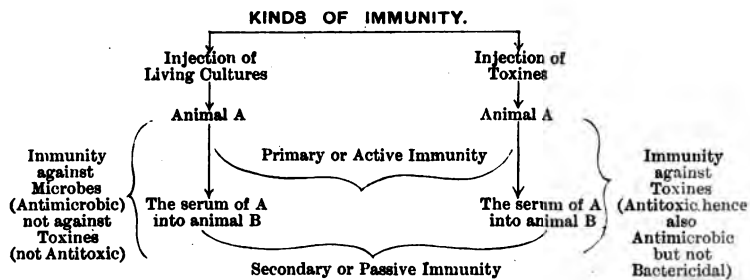


Fig. 5.

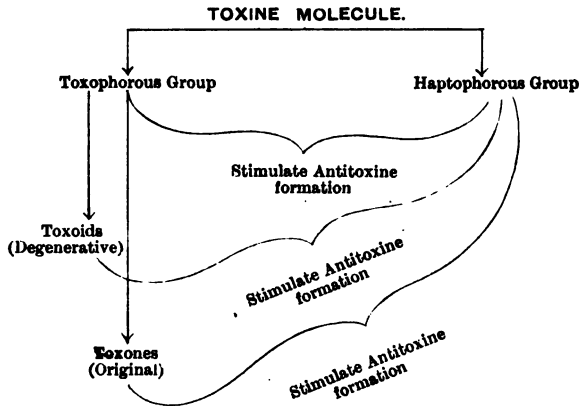
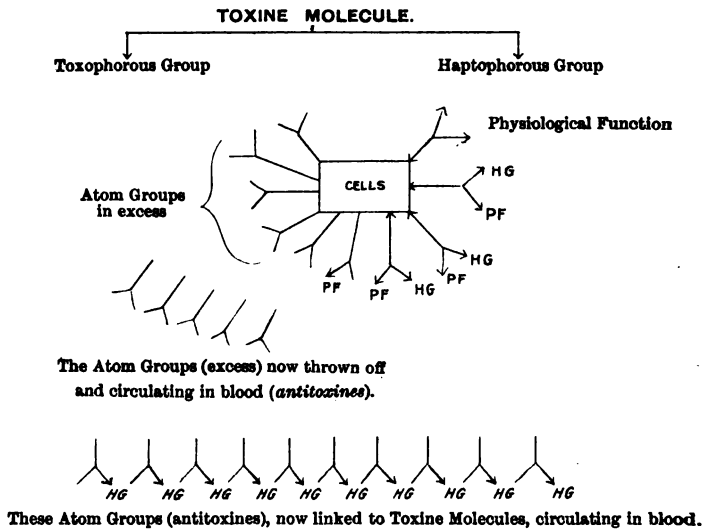


Fig. 6.



Schematic view of how the Toxine Molecule can act only when united to a cell by its Haptoporous group; how Antitoxines are formed, and how the Toxines are harmless when united to them.

from the supposition that the toxins which a bacterium forms in artificial conditions of growth are necessarily identical with those which it produces in its natural habitat within the animal body.

#### SPECIFIC ACTION OF THE TOXINES UPON THE TISSUES.

While then we cannot be said to know much about their method of production, yet we do know that they exert a specific action upon the body and its tissues. They act not only locally upon the tissues, giving rise to characteristic lesions, but also generally upon the system, causing, through their absorption into the circulation, characteristic symptoms. When bacteria gain an entrance into the body they do not all cause these characteristic symptoms to appear at the same time; some appear sooner, some later. We say they have different lengths of incubation period and it is possible that the explanation of this is to be found in their different methods of toxine production; those, in which the toxins are directly and freely excreted as such, shewing a short incubation period, and those in which ferments are first formed, or which act chiefly through poisons of intracellular formation, having a longer one according to the time taken for the establishment of the various stages of the digestive action, or the liberation of the intracellular poisons in sufficient amount.

#### THE NATURE OF THE TOXINES.

We cannot be said to know much about the nature of the different toxins, although it is certainly a good deal more than about their method of formation. We do not yet know the exact composition of any single one of them, for not one has been isolated in a pure form. We know however that, though all differing from one another, they all belong to a well-defined group of poisonous substances possessing well-marked and similar properties. Other members of this group occur freely, both otherwise in the vegetable and in the animal kingdoms. We need only mention in illustration ricin and abrin, two vegetable poisons of great potency, and snake and scorpion

poisons. It is not necessary to enter into any detail regarding the characters of this great group. We know a good deal about the similarities and differences of its members, but we have yet to learn much about the individual toxines themselves. There is every probability that their composition and conditions of production are even more complicated than any result we have so far been able to obtain by practical experiments, or even aim at by reasonable theoretical suggestions. Marmorek recently informed me that he believed he had hit upon a reason why the streptococcus as ordinarily cultivated produces so little toxine. The amount of toxine produced by any given culture is usually so small in comparison with the number of germs present as to suggest the presence of some inhibitory substance of early appearance and extracellular position. *Vide* Fig. 2. He found that while the germ free filtrate of such a culture possesses very little toxine, it will yet prevent the growth of fresh streptococci, for if these be added to the filtrate they do not grow, whereas other organisms, *e.g.*, typhoid, plague, cholera, etc., flourish readily. This substance is produced by the streptococci and its presence stops their specific action, in other words, their toxine formation. They have not lost this power. It is only in abeyance, and the removal of the substance would quickly result in more toxine production; but it would appear to be of coincident or nearly coincident formation with the toxine itself since the production of the latter again soon comes to an end. By its successive removal it becomes possible to obtain the full amount of toxine production, and it is very considerable, from any given culture. He has not yet succeeded in isolating this substance, and he knows nothing as to its nature, beyond the fact that it is inimical to the growth and development, and hence to the disease producing power of its own organism. If further experience should show that not only the streptococci, but many other germs have this action, which we may term for the present a dual one, and always or sometimes produce extracellular substances inhibitory of their own powers of multiplication and toxine formation, it will open up new views on the subject, and still further complicate its problems.

## THE DEFENSIVE POWERS OF THE BODY.

The toxins of bacteria, whatever their true nature, are certainly their offensive weapons, and they are arms of long distance range. By their means they wage war against the general bodily health. It is not, however, a one-sided fight, since the tissues possess considerable powers of defence, which are called into requisition whenever a bacterial invasion occurs. These defensive or actively resistant powers exist naturally within the body at the time of birth and are capable of and usually undergo great reinforcement as time goes on. They may come indeed to be so strengthened as to be able to successfully repel and resist certain bacterial invasions.

Pathologists are pretty generally adopting the belief that practically all disease is bacterial in origin. They are no longer satisfied that chills, fatigue, etc., can of themselves produce it. Such agents are no doubt powerful enough in deteriorating and so reducing the vitality of the tissues that disease may set in shortly after their incidence. They must be regarded, however, as able to act only as the predisposing and not as the exciting causes. They so weaken the natural resisting powers of the tissues that the latter, more or less easily, fall a prey to a bacterial invasion, which would otherwise prove harmless. An enquiry into the characters of these resisting powers is therefore of supreme importance to the life and health of the whole animal creation. A very large amount of most valuable work has already been done in this direction, but much remains to be done. So many are the able workers in this field, so earnest, vigorous and persevering are their efforts, that we may safely prophesy that the future, and we hope it is near, will disclose many secrets of the greatest value to mankind. It is too intricate a subject for us to attempt to enter into in any detail at the present time, but we may with advantage refer to its main facts and its more established doctrines. The chief, if not the only way, by which increased resisting power may be brought about, is one which does not at first sight appeal to us. It savours too much of locking the stable door after the steed has been



stolen, but its aspect changes when we come to examine it more closely. The underlying principle is that one attack of a disease, from which an individual recovers, protects him from a second attack of the same disease. It is, unfortunately, not a general protection, but special only for each particular disease. Thus one attack of measles, scarlet or typhoid fever will generally be found to protect the individual from a second attack of the same disease, but not from the others. This applies, so far as our experience goes, to a very large number of diseases, and for this result to be obtained it is not necessary that they should be acquired by a natural process of infection. Artificial inoculation of any disease, either in its ordinary or modified form, is equally efficacious. This has long been empirically known and practised in the case of small pox. Immunity to this disease is given not only by a previous attack in its ordinary form, either naturally or artificially acquired, but also by Jennerian vaccination. The inoculation of the virus taken from a small pox pustule, especially from a mild case, was often practised before Jennerian vaccination was discovered, and it was generally successful in producing the disease in a mild form and in protecting the individual from a future attack. In Jennerian vaccination the lymph is taken from a case of cowpox, which is merely the same disease in a modified form. It has now been practised for about 100 years and at the present day is in extensive and general use all over the world. Its protective efficacy is undoubted, and it has completely gained the confidence and support of everyone, except a very small minority of very prejudiced individuals. The protection afforded by these three methods is the same, differing in degree only, being, as was to be expected, greatest in the natural disease, less great in the ordinary cases artificially inoculated, and least in the vaccinated ones.

The principle involved in Jennerian vaccination was followed out by Pasteur with brilliant results, and it has since formed the basis of an immense amount of work in a similar direction, which has already proved abundantly fruitful and productive. This

has suggested the possibility of the existence of the general law, that immunity to all diseases may be established for man by treating him with their specific viri, so modified as to be in themselves harmless. We have thus come to be provided with a number of prophylactic lymphs in relation to certain diseases which have already given much success and promise. Our knowledge of the causal relation which certain bacteria bear to certain diseases has enabled us to work in this field with far greater success than we could otherwise have won. We can produce many specific diseases at will, and in such a way that their severity, course and progress, remain entirely under our control. We aim at the production of a mild form of the particular disease, and this we can do with certainty in a variety of ways. 1. We may inject the living organisms in an attenuated condition of virulence. Such attenuated cultures are generally known as vaccines, as the principle is obviously the same as that of vaccination. It is capable of very wide application and has already given excellent results in a number of diseases.

2. We may inject the living virulent organism in non-lethal doses. The virulence of any organism is constantly undergoing change, generally towards attenuation, but we are able in various ways to restore it to its original virulence or even to greatly exalt that virulence. By preparing a series of cultures of the same organism of varying virulence, commencing with attenuation and ending with exaltation, we are able to graduate the dosage at will. These two methods may be combined with advantage. Experience has now shown it to be generally best to begin by injecting an attenuated culture and to employ doses of gradually increasing strength and virulence in subsequent injections, until at the end a high degree of virulence has been reached. In this way a high degree of protection may be arrived at. Cholera gives us a good example. In the human subject, two and sometimes three inoculations with the attenuated virus are made before the virus *exalté* is used. It is known as Haffkin's method and has been extensively used in India during the last five years with encouraging results. The

Pasteurian and likewise the Italian method of producing protection against hydrophobia is carried out in a similar manner, although as yet, it is empirically used since we know nothing of the *causa causans* of that disease.

3. We may inject the toxines from which the bacteria have been separated by filtration. These toxines can have their strength diluted or concentrated by various means. We generally begin by injecting small non-lethal doses of the strong toxine or larger doses of the attenuated toxine. Doses of increasing strength are then used. This method is also capable of very wide application, and immunity of a high degree can be obtained by it. Its greatest triumphs so far have been obtained in diphtheria and tetanus among the more commonly occurring diseases, and also in the case of snake poisons. It was thought for a time that equally good results might be procured through the administration of the toxins by the mouth instead of by injection; but notwithstanding Fraser's success with snake poison, and Ehrlich's with ricin and abrin, the two vegetable poisons already mentioned, where animals have been made immune to an injection of many times the lethal dose by previous feeding with these poisons, no practical use has yet been found for this modification of the method.

4. We may inject the toxines along with their microbes, having previously destroyed the vitality of the latter alone by some physical or chemical means. We here make use of the poisons residing within the bodies of the microbes in addition to their extracellular toxines. Haffkin's prophylactic against plague, which has given such successful results, is prepared in this way. He may be said to have diminished the mortality from plague by about 80 per cent.; an estimation based upon over 100,000 inoculations in the human subject, and thus to have saved thousands upon thousands of human lives. There are yet other methods, differing from one another, as these do, in important details, but, although so differing, they all agree in that they introduce into the body the specific morbid agent in such a modified form that while it is harmless for evil it is yet

productive for good. It is obvious that while the question of dosage is an all-important one in all the methods, extreme exactitude is of necessity of far greater moment when the living virulent bacilli are used than when the dead bacilli and their toxins are employed. The immediate effects which follow upon the entrance of any of these morbid agents into the body, depends not only upon the nature of the agent and the extent to which its powers have been modified, but it also further depends upon the particular animal employed. Animals may behave in a very different manner to the bacteria themselves and to their toxins, some showing little reaction to a large dose of the former and a great reaction to a small dose of the latter, and *vice versa*; others again reacting severely to both, or not reacting at all to either. The subsequent immunity thus produced varies also with all these factors, but more especially with the particular kind of animal employed, some showing a high and lasting degree, others less, others slight or none, and some even apparently a greater susceptibility than before. These facts, while they do not negative the universal application of a general law that the acquisition of an artificial immunity is always possible, yet make its acceptance, at the present time, impossible. It is more than probable, however, that these limitations have arisen through our present imperfect knowledge. We have not got the desired results because the paths by which we have sought to reach them have been faulty. The methods at present at our disposal have given us excellent results in some animals and in some diseases, but it may be that other methods of which we are yet ignorant are required for other animals and for other diseases. We may assume that a method which is good for any one disease in any animal will prove equally efficacious for the same disease in another animal, or for a different disease in the same animal; but if we find the assumption to be wrong, we are not entitled to say that the same results are not obtainable. We may yet come to obtain them by the use of other means.

The resisting and protective powers reside within the cells and

general fluids of the body. *Vide* Fig. 3. It was for a time thought that the cells, the leucocytes and many of the connective tissue cells, possessed the whole of these powers, and the theory of Phagocytosis, one of the most brilliant and fascinating doctrines ever promulgated, was elaborated with masterly skill by Metchnikoff to explain how immunity was brought about. The cells were thought to be doughty warriors of great fighting power, and often extreme activity, ready at all times to wage implacable war against their bacterial enemies. It was thought that when hostile bacteria invaded the tissues, the leucocytes and wandering cells sallied forth from the blood-vessels, etc., in countless hordes, to give them battle, and that if the victory went to them the individual escaped; whereas if it rested with the bacteria, he became a prey to the specific disease they are capable of producing. There can be no doubt that the phagocytes, as these cells are called, play an important part in the establishment of protection. They have the power of ingesting germs and retaining them within their protoplasm, and that not only after the latter are dead, but while they are still alive and capable of producing their specific effects. They cannot, however, any longer be regarded as the sole protecting agents, at least directly, though it may well be that the protecting powers come primarily from them. The single fact that immunity can be brought about by the injection of the bacterial free toxins alone disproves it. There must be other agents, and these have been found to reside within the fluids of the body generally, and hence in the blood serum as it is representative of them all. The normal blood serum free from cells possesses protective powers, for it can be shown to be able unaided to bring bacteria, in certain numbers at any rate, to death and destruction. These powers are capable of being greatly increased.

We have already seen that, if we inject gradually increasing doses of living cultures of a particular bacterium into an animal, we can render it immune to the action of that bacterium. It is, however, usually a partial immunity only, in so far as, although the living bacteria themselves have no effect, their toxins are as

powerful as ever. *Vide* Fig. 4. If we inject the latter in sufficient dose the characteristic symptoms of the disease will show themselves exactly as they do in an unprotected animal. If the blood serum, withdrawn from an animal protected in this way, be injected into a second animal, it will confer a similar though generally less strong immunity upon it. Such a serum has in a considerable number of instances the power of inhibiting or paralysing the bacterium and preventing it from producing its toxins. It is called antimicrobial. It cannot actually kill the germs, it can only weaken them so that they fall victims to the normal bactericidal powers of the body. *Vide* Fig. 3. We have already shown that it has usually no antagonistic action to the bacterial toxins, hence we say it is not antitoxic. The antistreptococcal serum (Marmorek), and the anticholera and antityphoid sera (Pfeiffer) are examples of sera, which, although antimicrobial, have little or no antitoxic power. On the other hand, if we produce active immunity in an animal by injecting gradually increasing doses of the bacterial free toxins, we can obtain a serum from it, which will protect another animal from what would otherwise be a lethal dose. Since this serum antagonises the toxins we speak of it as antitoxic. The antidiphtheritic and antitetanic sera are excellent examples. Antitoxic sera always protect against the living organisms also and are therefore antimicrobial, though they may not be bactericidal, for in the instances just given, viz., diphtheria and tetanus, the germs of these diseases grow readily in their respective sera, but they are not capable of producing any result as their toxins are rendered non-effective. *Vide* Fig. 4.

It is the case that in most if not in all infectious diseases, the specific microbe is still present in the individual during convalescence, and often much later, not perhaps in such numbers as during the height of the disease, but still in considerable numbers and in a virulent form. This can easily be demonstrated by cultures or by transference to another animal. They are harmless because their toxins are now neutralised, and after a time they fall victims to the natural bactericidal powers of the tissues and disappear entirely. *Vide* Figs. 3 & 4. The relation and distinction between antimicrobial and antitoxic sera are

not always so simple as we have thus sketched. We must for instance guard against thinking that a serum must be purely antimicrobial or purely antitoxic according to the method by which it is prepared. This is true only within general limits, for an antitoxic serum can be obtained by injecting living diphtheria bacilli, as well as by their germ free toxins ; and an antimicrobial serum can be obtained by injecting the toxins, freed from their respective germs, *e.g.*, typhoid or cholera, as well as by injecting the germs themselves. The latter is simple enough, but the former is somewhat puzzling and is probably to be explained by the formation of the antitoxic property taking place through the instrumentality of toxins formed by the bacilli within the body.

It is thus seen that certain changes of great moment take place within the blood serum in the establishment of active immunity however brought about, and further that similar changes may be made to occur in a second animal, by transferring into it some of the blood serum of the first. The immunity thus conferred upon the second animal is spoken of as passive or secondary to distinguish it from the active or primary immunity produced in the first animal. *Vide* Fig. 4. Passive immunity of a high degree may often be reached, though it has generally been held to last a relatively shorter time. Recent investigations have tended, however, to throw considerable doubt upon this belief. It has been found that the species of animal employed has a most important bearing upon the result. Thus if we create active immunity in animal **A** and use its blood serum to produce passive immunity in animal **B**, the latter will be practically as powerful and as lasting as the former, provided that both **A** and **B** belong to the same species, *e.g.*, both rabbits ; whereas if they be different animals it will be comparatively slight and transient. In other words, an alien serum has little, whereas a friendly serum has much power. Passive immunity forms the basis of serum therapeutics, for since these sera were capable of protecting against subsequent infection, it became natural and far more important to ask if they could also counteract previous infection, and be used not only as prophylactic, but as curative

agents. The results have been found to be of a highly encouraging nature in diphtheria and to be not without promise in tetanus, etc.

It is obvious that new and highly complicated problems are thus brought into the question, and generally speaking we may say that the efficacy of any curative serum will depend among other things upon the time of its injection (the earlier the better) and upon the accurate estimation of the dosage. When we think of how these curative sera have been evolved, we may be inclined to say that after all there is some truth in the old saying generally adopted by our homeopathic brethren, "*Similia similibus curantur.*"

A little consideration will show that while a vaccine may have merely a directly or indirectly bactericidal influence a curative serum must have anti-toxic power. In these diseases, *e.g.* typhoid, cholera, etc., in which the microbes invade the tissues and multiply greatly therein, and of which the toxic effects, though always present, are proportionately small in comparison with the numbers of organisms present, the anti-toxic power need not be great, while in others in which the reverse is the case, the anti-toxic power must be much greater. Artificial immunity was obtained in the earlier experiments on animals only after many injections extending over a considerable interval of time, a system inapplicable to man; for, to be useful and practicable, it is obvious that a prophylactic must not require too many injections or take too long a time to act. Later experiments both in animals and man have fortunately demonstrated that artificial immunity even of a high degree can be obtained by very few injections extending over a very short interval of time. In cholera, for instance, it is obtained in four days after two or three injections. In some cases one injection only proves enough, and may be even more efficacious than several. Pfeiffer and Kolle by means of one dose of cholera vaccine in man produced a high degree of protection, as great as that obtained in goats after injections of enormous doses of the vaccine extending over nearly six months. The serum in this case had very great



antimicrobial but no anti-toxic power. Pfeiffer recently informed me that he has employed this method with great success in the case of typhoid fever. He finds very large dogs most suitable, and can produce not only a high degree, but the highest obtainable degree of immunity after only one injection. Their serum can protect other animals from lethal doses of the toxins subsequently or even simultaneously introduced. Its effect has not yet been tried upon man. We cannot yet say what interval must elapse between the injection and the production of protective substances. In plague, indeed, it would appear to be very short, about twelve hours or perhaps less, and certainly as soon as the reactionary symptoms following upon the inoculation have disappeared.

It is difficult to understand, much less to explain, how a vaccine can act so quickly. Nay more, in the light of our present knowledge it may seem to us impossible, yet we have the record of experience before us which seems to show that it can actually occur. Future knowledge may unravel the mystery for us. A serum may fail to cure and yet possess considerable antitoxic power. Its failure may be due to its not being strong enough, to its not being administered soon enough, or in sufficient dose, or to yet other causes. Such sera appear to possess strong protective powers which can be quickly brought into play, much more so indeed than is the case with their corresponding vaccines, but when we come to ask why, we can find no answer.

#### THE NATURE OF THE ANTAGONISM BETWEEN TOXIN AND ANTITOXIN.

The nature of the antagonism between toxin and antitoxin is a very complicated one, and as yet far from being known and understood. Much ingenious speculation and induction has been indulged in, and until very recently we were much at sea regarding it. It has long been closely and keenly debated whether the antagonism was a chemical or physiological one, and the latter view was most generally accepted previous to the

publication of Ehrlich's work last year. It led to an earnest revision of the whole question and the balance of evidence and opinion now leans strongly to the other side. Toxine and anti-toxin can be made to combine in a test tube outside the body much in the same way as they do within it, and their various reactions point clearly to the nature of their union being in all probability a chemical one. We can even go further and suggest with much show of reason that their union is similar to that which prevails in the formation of a well known class of chemical substances, viz. double salts. Many of their reactions are in accord with those which regulate the union of an acid and a base, but others do not harmonise with this view, tending rather to support the double salt nature of the process.

Ehrlich suggests that the toxine molecule consists of two atom groups, the one, haptophorous, having the property of binding the toxine and antitoxine together; and the other, toxophorous, carrying all the toxic properties. *Vide Fig. 5.* The former is a relatively simple and stable group, while the latter is complex and unstable, readily breaking down into non-toxic substances which still remain linked to the haptophorous group, thus preserving the integrity of the toxine molecule, now, however, no longer toxic. He proposes the name of toxoids for these non-toxic substances. It is by means of the haptophorous group that the toxine molecule becomes united to the anti-toxine, and hence it will require the same amount of the latter to neutralise it even if it have previously lost all its toxic power. It is possible further that bacteria may sometimes produce, *de novo*, similar toxoid molecules, and not only through the degeneration of a previously toxic group. Ehrlich, indeed, asserts that he has found evidence of this in diphtheria, and proposes the name of toxones for such naturally produced toxoids. We have already explained that when toxins are injected into an animal they lead to the production of anti-toxins within its tissues which may result in their neutralisation. This result will therefore follow whether the toxine molecule preserves its toxic group unchanged or has become degenerated into harmless toxoids.

Should this speculative deduction prove to be well founded it will greatly facilitate the more general adoption of inoculation by vaccines. At present many people object to submit themselves to inoculation, because it means their artificial acquisition of a disease which they might never naturally acquire; and although it produces the disease in a very mild and modified form, yet it at least suggests a certain amount of discomfort, and our luxury loving late nineteenth century bodies dislike present discomfort even with a prospect of future advantage. If, however, toxoid inoculation should prove to be feasible, and if we could thus become assured that the process was perfectly harmless, and, while retaining its full influence for good, was now robbed of all unpleasantness, such scruples to its general adoption would surely disappear.

In further explanation of the production of anti-toxins, Ehrlich supposes that certain cells of the body possess special atom groups which, while normally performing a definite physiological function, have a special affinity for and unite with the toxine molecules when these latter are introduced into the body. *Vide* Fig. 6. This is not entirely speculative, for it has been shown experimentally by several observers that the grey matter of the central nervous system of animals susceptible to tetanus has the power of neutralising a certain amount of tetanus toxine, while in insusceptible animals it has practically no such power. Neutralisation has presumably arisen through combination, and these tissue cells to which the toxine molecules have become linked lose thereby their power of performing their normal physiological function. They proceed to restore it by the formation of new atom groups, which in turn combine with fresh toxine molecules. This process of restoration and fresh linking goes on until there comes a time when the regeneration of these atom groups advances more rapidly than the needs of the cells require either for toxine combination or performance of physiological function. The excess of atom groups is then liberated from the cells and carried into the circulation, where they now act as anti-toxins. It is only after the atom groups have been set free

that they can act as anti-toxins. Those still fixed to the cells in combination with the toxins have no such power. It is, indeed, by their means that toxins are able to exert their specific action upon the body. While still circulating in a free condition they are harmless, and if they meet and become linked to anti-toxins, also free, they remain harmless ; whereas, if they become linked to the anti-toxic atom groups when these are still attached to their cells, their toxophorous atom groups can at once affect the cell protoplasm, and their specific action begins to appear. This explanation of the formation of anti-toxins is largely speculative, but there are strong reasons for believing that it is very near the mark. It is a fascinating subject, and we must not now allow it to detain us further.

#### PRACTICAL LESSONS AND DEDUCTIONS.

It is a reasonable deduction from these facts to say that throughout the whole lifetime of man he is gradually undergoing immunisation of a kind or kinds which will naturally vary with his environment. There are few who do not suffer at times from some minor ailment. It may be but a headache, or indefinite passing malaise, described as being "out of sorts ;" and yet, if we knew all, it might be traceable to a distinct bacterial invasion, the slightrness of the results being due perhaps to a fortunate combination of attenuation of the germ and a vigorous state of the resisting powers. Physicians know that many of the infectious diseases may occur in such mild forms, that, although definitely recognisable, they hardly cause any illness, and might not even interfere with the usual routine of the patient's life, were it not that he is a source of danger to others. May they not occur in yet milder forms, and, escaping true recognition, be regarded as simple malaises of a general nature ?

There is nothing bacteria loves so much as a virgin soil. Our present great knowledge as to the causation of disease and our greatly improved sanitary methods, have already enabled us largely to guard against infection ; and as we are certain to make still greater progress in this direction, we will be able to do so still more effectually in the future. This very freedom from

disease will render us more liable to attack whenever our environment changes. Those of you who have read that clever book by H. G. Wells, called "The war of the Worlds," will remember how the Martians, who had invaded this planet and carried death, destruction, and devastation everywhere, were quickly exterminated by our bacterial forces, although our powers of ordinary warfare had proved powerless against them. If, previous to the invasion, they had only taken the precaution to use some of our protective vaccines, the result might have been widely different. It is a lesson which I hope we ourselves will learn. Not that we intend, so far as I know at any rate, to invade the planet Mars. We have not yet taken from this planet all we want. Our present dominions, as you well know, are widely scattered over every quarter of the globe. Consequently, many of our fellow subjects require to frequently remove their residence from favourable sanitary home surroundings to less favoured regions elsewhere. It becomes us therefore to see that they are protected in every possible way. Preventive inoculation should be employed, especially against such diseases as the plague, cholera, and typhoid fever. The evidence in favour of the protective vaccines from these diseases is now so great as to amply justify their adoption. Pasteurian immunisation has greatly diminished the mortality from natural anthrax among animals. Yellow fever, if Sanarelli's results prove to be true, and yet other diseases are gradually being brought into the protective fold.

The value of protective vaccines in epidemics in this, as well as in other countries, will probably soon be shown to be very great. We cannot expect to meet with equal success in all diseases. In tuberculosis, for example, there are reasons why we should not do so. There is no evidence that one attack protects against a second, and its usual, slow, long-continued and progressive course would seem to suggest that it does not lead to the formation of any protective or antitoxic substances; but experiment has shown that they are really produced, and although success has not yet crowned our efforts, we may at least be said to be "getting warm." Our hopes have been raised

several times, only alas to be dashed to the ground again. We had, first, Koch's original tuberculin, then Maragliano's vaccine, and lastly, Koch's new tuberculin R. The first proved valueless and even dangerous (as a curative agent), the second may have secured a certain measure of success in mild cases, but although it may be able to protect against tuberculin, there is no evidence that it can do so against the bacillus itself, or that it can cure affected animals; and the third has been equally unfortunate, having proved so far to have been of little practical value except in a few cases of lupus. Our knowledge of the bacillus of tubercle, of its actions and its products, is now so great, that it is a matter of general wonder that we have made so little progress in lessening its ravages. In one form or other it is responsible for nearly a quarter of all the deaths of this country. There can be little doubt that there is cause here for grave reproach somewhere.

Occasionally the practical sanitarian hurls it at the bacteriologist, crying, "with all your discoveries what good have you done?" This is doubtless but the bitter wail of the practical man driven to despair, for the bacteriologist might well retaliate and ask if full use had been made of the discoveries he had already provided. If steps had been taken, for only a few years back, to secure the destruction and prevent the dissemination of the bacillus, especially in the crowded houses of the poor throughout the land, there is every reason to believe that the mortality, which we have still to-day to deplore, would have been enormously diminished. The public conscience has been awakened at last, and the mighty voice of the people hath spoken, so that we may look confidently forward to great practical good coming from the present day crusade against tuberculosis. It will be well if Birmingham is found in the van of this clamant and much needed reform, as she has so often been in other great and noble efforts.

#### EXTENSION TO DIAGNOSIS.

The principles underlying protective inoculation have within the last few years received practical application in yet another

direction, and have given us a new method of diagnosis of great value, which is generally spoken of as "the serum method of diagnosis." It has been demonstrated by an elaborate series of investigations that the serum of an immune animal, when added to an emulsion of a young culture of the various motile organisms, *e.g.*, cholera, typhoid, causes the germs to gradually lose their power of motion, and to become gathered together into clumps. It is a specific and not a general reaction, a typhoid serum acting only on the typhoid bacillus, a cholera serum upon the cholera bacillus and so on. So complete and extensive is the reaction that it can be seen, not only by the aid of the microscope when small quantities of the fluids are mixed together upon a slide, but also by the unaided eye when equal parts of diluted typhoid serum and bacterial emulsion are placed together in a thin glass tube. This mixture, instead of remaining uniformly morbid, becomes gradually clear, so that after the lapse of about twenty-four hours, the upper part is quite clear, whilst the lowest part is occupied by a dense precipitate consisting of motionless bacilli agglutinated together in clumps. The latter is known as the sedimentation test. It may form a useful control to the microscopic method.

It was already known that the serum from a convalescent typhoid patient could confer upon animals a certain amount of protection from typhoid, and Widal further found that it could produce this clumping reaction. He then discovered that it was not necessary to wait for convalescence, that the reaction was given at a very early stage of the disease, generally appearing as early as the seventh day and sometimes considerably earlier. It could therefore be used as a means of diagnosis. It gradually becomes more marked as the disease advances and is generally well marked though occasionally it disappears during convalescence. It may still be present after several months, but we cannot yet say how long it usually lasts. Pericardial and pleural effusions, the bile, the milk, and to a less degree the urine from cases of typhoid fever also give the reaction. In cases where the serum of the mother gives it distinctly, that of the foetus may

or may not do so. The circumstances determining the passage of the agglutinines through the placenta have not yet been determined. The normal serum of the horse, the ass and the rabbit will clump not only the typhoid bacillus but the coli as well.

Many other important particulars regarding the reaction might be given, but they concern the true nature of agglutination, about which we are still much in the dark, rather than its value as a practical means of diagnosis. An immense number of observations have now been made as to the latter, and there appears to be no doubt that it is thoroughly reliable, and will give an accurate result, if due precautions be observed, in nearly 95 per cent of all cases. It is then not only a valuable aid to diagnosis, but it may give earlier and truer indications than the clinician can obtain by means of his whole armamentarium. It is applicable to other diseases caused by other motile organisms, *e.g.*, bacillus cholera, bacillus coli, plague, &c., and some at any rate of the non-motile forms, *e.g.* bacillus of glanders. Whether the changes which bring about this clumping action are connected with the production of immunity or not we cannot say, but it would at any rate appear to be certain that very early in the course of certain diseases the blood serum acquires properties which exert a paralysing action upon the causal bacilli. They are not killed for they can still manifest their specific action. A precisely similar action is exerted by most antimicrobic sera. Of themselves, they have no power to destroy, but only to inhibit their specific bacilli, which are killed only when the bactericidal powers of the body come into play. So here, if a solution containing clumped bacilli be injected into the peritoneal cavity of a healthy animal, or even added to some of its peritoneal fluid in a test tube, the bacilli will become disintegrated and disappear in the fluid.

The foregoing propositions embody the principles which govern the whole range of the science, but there are others which apply more particularly to individual organisms, and it will be necessary to refer shortly to them.



*The pyogenic group.*—Among the pyogenic bacteria much has been done towards the elucidation of the precise role played by some of the less known forms such as the micrococcus tetragenus, towards the resolution of the varieties of the streptococcus, towards determining the action of the bacillus coli, and towards settling the pus producing power of the typhoid bacillus. The systematic examination of every purulent fluid would do much to clear up these and kindred questions. Film preparations should be made in all cases and cultures in most. The clumping re-action test should be applied in all purulent fluids where typhoid is or has been present or suspected.

*The gonococcus.*—In few diseases will a systematic examination of the discharge by means of films so well repay the practitioner as it does in gonorrhœa. If the dried films show large numbers of micrococci having the peculiar characters, position and staining re-actions of the gonococcus, we may confidently assert that the disease is gonorrhœa; and further, we can in the acute stage at any rate, thus make a positive diagnosis earlier than by any other method. Some authorities even hold that we may thus also gain much information as to the prognosis, but, be this as it may, there is no doubt that the systematic and periodic examination of the discharge by means of films in every case is of great value.

*The pneumococcus.*—The pneumococcus is the cause of acute pneumonia, though it may be associated in some instances with pyogenic organisms. It is plentifully present in the sputum and lungs both before and after the crisis of a non-fatal case, though less numerous at the latter time; and when we consider that in fatal cases death rarely follows from interference with the function of the lungs, but from cardiac failure, or hyperpyrexia, or general nervous depression, we are led to conclude that the general effects are caused by toxines, which become balanced and overcome by antitoxins naturally produced within the body by the time the crisis has been reached. This line of thought has stimulated work aiming at the preparation of both a

preventive vaccine and a curative serum. Although we have so far failed in the latter we have succeeded in the former quest, and it is a step in the right direction.

*The tubercle bacillus.*—If tubercle bacilli in any numbers be found in the sputum of any case, however uncertain or slight the clinical signs may be, we may with confidence assert that there is tubercular disease of some part of the respiratory tract, generally the lungs. The fact that they are occasionally found in small numbers in the sputum of a non-tubercular case which has been for a time in close proximity to a tubercular one can easily be eliminated. It is of no practical importance beyond teaching us the necessity of separating such cases. Tuberculosis has undoubtedly been thus acquired in the past and it is our bounden duty to prevent its recurrence in the future.

Similarly the presence of tubercle bacilli in the urine or effusion from the pleura or other serous cavity is indubitably diagnostic of the true nature of the case. We may discover tuberculosis by other means, the most important of which is the use of tuberculin in cattle. Thirty to forty centigrammes are injected, and if the temperature rises 2 to 3° F. in 8 to 12 hours, and continues up for 10 to 12 hours, we may safely conclude that the animal is tubercular. If the method be carried out properly it will be found to be fairly free from error. It fails in about three per cent. of the cases. It is being largely carried out on the continent, and to a certain extent, though not yet nearly widely enough, in this country.

*Glanders.*—Mallein can be used in the same way to diagnose glanders in animals, and veterinary authorities are practically unanimous that the test is one of great value.

*Anthrax.*—A recent act makes it illegal to open the carcase of an animal suspected to have died of anthrax, and veterinary examiners are sometimes at a loss how to proceed to obtain an irrefutable diagnosis. It is best to open one of the auricular veins and make both films and cultures from the blood. In man the same two steps are taken, using a little of the fluid from the vesicles or from a scraping of the incised or excised pustule.

*Diphtheria.*—There is no better instance than diphtheria in the wide range of diseased conditions, of the great assistance which Bacteriology has rendered to both the Science and the Practice of Medicine. Not only does it provide them with the only true, efficient, and reliable means of diagnosis, but it explains how the various phenomena characteristic of the disease are produced, and affords the best means of treatment yet discovered.

The true scientist is the least mentally prejudiced of men ; and while perseveringly striving with singleness of heart and purpose for the discovery of truth, and to further the health and welfare of mankind, he is ever ready to acknowledge the help and recognition given to him by others ; and it is therefore a source of great pleasure and satisfaction to the Bacteriologist to be able to put on record the ready and full assistance a generous recognition of his efforts towards the checking of this disease have received at the hands alike of his professional brethren, the practical physician and medical officer of health, and his lay brethren, those who hold place on the health board of cities. I have already seen enough in my work here to be able to say that no city is deserving of greater honour than Birmingham and some of her neighbours in this respect, and I hope soon to be able to include every town and district in the midlands in this mede of praise. The new worker in the bacteriological laboratory of this College finds ready to his hand a system so good, a practice so thorough in relation to the diagnosis of this disease, carried out too, be it remembered, under difficulties that none but the initiated can rightly appreciate, that he is perforce constrained to congratulate medical and lay authorities alike on what they have already done, and on what with the increased facilities now provided, they are likely to be able to do in the future. I cherish the hope that the department over which I preside will furnish a place where the skilled proficient in this or any other disease, or the aspirant thereto, will find a hearty welcome, and every facility placed within his reach to help and to stimulate him in his search after knowledge. We need not in our present theme

do more than refer in outline to the immense services which bacteriology has rendered to medicine in relation to diphtheria.

Clinicians in the past were wont to determine the presence or absence of this disease largely from the appearance and site of the membrane. Distinctions so drawn are now known to be of no value whatever, and I hope it is generally accepted and understood, as it is undoubtedly true, that a case may present all the old classical signs of diphtheria, so far as the appearance and distribution of the membrane is concerned, and yet be not diphtheria at all: and *vice versa*, a case may present none of these signs and yet be true diphtheria. I do not wish to appear in any way to exaggerate or to shake the confidence of the clinician in his powers of diagnosis, yet I say without fear of contradiction, that the only true and irrefutable means of determining whether a case is one of diphtheria or not lies in finding the bacillus in the throat. It is unnecessary to dwell here upon the difficulties which the bacteriologist may encounter in deciding upon the specific nature of the bacillus met with in any individual case, as to whether it is the true diphtheria bacillus or one of the forms which closely resemble it, but yet possess far less power and importance. Suffice it to say that they are such as melt away before the exhibition of his skill, and that with the tests as to staining, growth, and anatomical appearances at his command he is able to return an unhesitating answer. It may be urged that he is unable to exclude the pseudo-diphtheritic bacillus from his calculations, and it may be as well to give a clear pronouncement upon this point. That there are bacilli which closely resemble the diphtheria bacillus in nearly every aspect, and yet are not the same, need not be denied; but the sooner it is generally accepted that all bacilli which agree in the characters mentioned above, when tested by the skilled observer, are indubitably diphtheria bacilli, the better for diagnosis, prevention, and treatment. It is no proof to the contrary that a bacillus while conforming to our tests is yet non-virulent. Every bacteriologist has found how quickly and frequently certain of his cultures of undoubted

diphtheria bacilli lose all toxic power. Such bacilli are frequently found in the throats of healthy individuals. They may, under circumstances yet unknown to us, become virulent, and be the *fons et origo* of many an outbreak of the disease which so far has remained a mystery to us.

*Tetanus.*—The clinical symptoms of this disease are generally so conclusive of themselves that the practical observer does not feel the same necessity for bacterial corroboration; yet it ought to be carried out in all cases. The wound, and it ought to be clearly and decidedly proclaimed that a wound or abrasion of some sort must be present, should be examined for the bacillus by means of film preparations of the discharge. Cultivation and inoculation may have to be used before a decision can be given, but one or other usually affords conclusive proof. The popular belief that a wound of the hand or foot is particularly dangerous in its liability to be followed by lockjaw has no more foundation in fact than that in such positions it is more liable to be contaminated by dirt than in others. The bacillus is one which flourishes in the soil, and every wound which shows signs of contamination by soil, especially if ragged and unhealthy looking as well, ought to be examined bacteriologically. The presence of tetanus may thus be detected before any symptoms appear, and the earlier application of the proper treatment may achieve more successful results than we have hitherto been able to obtain.

*Cholera.*—This is not a disease of which we are likely to have much practical experience in this school of medicine, yet it is a disease to which many of our fellow subjects of this Great British Empire are exposed, and hence we, like other teachers of young practitioners, who may be called upon to practice all over the world, must be prepared to deal with it. It is another striking instance of the contributions which bacteriology has made to practical medicine. Alike in diagnosis and treatment it has provided the most effectual means of dealing with the disease. A microscopic examination of the dejecta is frequently sufficient, as many cases give almost the appearances of a pure

culture. Koch states that during the Hamburg epidemic this method was sufficient in 50 per cent. of the cases. In other instances other methods known to bacteriologists, including the serum method, must be practised, and one or other is certain to meet with success.

*Influenza.*—This has become quite a fashionable disease. So prevalent has it really been and often so serious in its consequences that the sufferer readily secures the sympathy of his friends. This leads him to hope rather than otherwise, when his illness even remotely resembles influenza, that this will be the fiat of his doctor, and there can be little doubt that medical men, always ready and willing to further their patient's wishes, have greatly increased the elasticity of their diagnosis of this disease. The patient indeed is rather proud of being its victim. It is quite common for him to declare to his friends, that his own opinion is that a particular ailment from which he has just recovered really was influenza, although his doctor, not detecting it, thought it to be something else. Usually, the doctor is only too ready to humour his patient, so that the scrupulous and conscientious part of the lay mind has begun to be a little sceptical on the subject. The great frequency and chameleon like aspect of the disease have already caused not a little misgiving. Regretful doubt keeps whispering that the physician may be wrong. Here is a chance for the bacteriologist. His methods cannot err. His films and cultures made from the small round masses of greenish yellow sputum are beyond all doubt. Think of the pride of the man and woman who, with a bacteriologist's certificate in their pockets, may claim their place among the *élite* without fear of question or cavil.

These diseases which I have thus specially mentioned are fair representatives of the whole, and I need not detain you with references to others. Long and laborious study is needed to attain even a moderate proficiency as a bacteriologist, and no man can well become a past master in every part of the science. Marmorek, who has devoted more time than any other worker to the streptococcus alone, when asked how long it would take to

master this one organism thoroughly, answered that he did not know, for he had worked at it for only eight years. He is still a young man, and perhaps he may yet have an opportunity of answering this question in the words of the great Torwaldsen, who when asked how long it would take to know The Eternal City thoroughly, answered that he did not know, for he had only lived there for forty years.

I am well aware that this endeavour to place before you the recent advancements and refinements, which bacteriology has accomplished in the domains of the diagnosis and prevention of disease, labours under all the imperfections and disadvantages, which usually pertain to any attempt to explain a difficult and complicated subject within limited and popular lines ; but I have remembered that however great the interest and fascination, which the elaborated experiments, arguments and discussions, that go to the establishment of all great doctrines, have for the specialist, they cannot be expected to appeal in the same way to others, particularly to the already overtaxed and over-burdened practitioner and student of medicine. I am sure you will thank me, inwardly at any rate, for having mercifully spared you their infliction. I hope, however, that I have said enough to demonstrate the immense value of the assistance, which the bacteriologist is able to render to mankind, both in diagnosing and preventing disease. I do not wish it for one moment to be supposed that I think his methods can, in any way, supplant those of the clinician. They are but the complements thereof. Let him continue to exercise his clinical skill as fully, as freely, and as perfectly as of old ; but let him accept the bacteriologist as an honourable helpmate, and never hesitate to call to his aid the assistance which he so abundantly provides, and is always pleased to render. It is by working loyally side by side and hand in hand that the clinician and bacteriologist can best carry on the struggle against disease. Let them continue at all times to strive together for the health and welfare of mankind. Without health, enjoyment in life is indeed hard to find. With it, we have a pleasure in listening to the teachings, and striving to

follow the precepts of the Platos and Priestleys, the Gairdners and Muirheads of this world. *Sanitas est vita*, and "without the means of life our lightest ideal hangs idle in the air." Let the clinician and the bacteriologist work together to secure for mankind such a life of health as will enable him to fully devote himself to the ideals and pursuits, which satisfy and beautify his life, and thus secure for him the opportunity of keeping his cup of happiness not only full to the brim, but running over.

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## A CONVENIENT MODIFICATION OF THE PARAFFIN IMBEDDING METHOD FOR SECTION CUTTING.

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THE fine results obtained by the usual Paraffin methods leave little to be desired, especially when the tissues to be sectioned have been carefully "fixed" and dehydrated. But the usual process is a long one. The oil of cedar-wood does not always penetrate the tissue as quickly as could be wished, and must be carefully replaced by the paraffin in order to get good sections. Usually one or two successive paraffin baths are necessary. In ordinary histological or biological work there is perhaps no need to hurry any stage of the process. But in pathological work it is frequently of great importance, for the purposes of diagnosis and prognosis, that the section-cutting should not take too long. This being so, any method of shortening the time necessary for infiltrating with the paraffin, or with the clearing agent which precedes it, is well worth considering. In describing the procedure I have found to be most expeditious and at the same time satisfactory in giving generally good results, I shall not say anything about the previous fixation and dehydration of the material to be cut. Several excellent methods are given by Lee in the "Microtomist's Vade Mecum;" and also in



"Methods of Pathological Histology," by Von Kahliden. I would only remark here that the pieces of tissue to be dealt with should be small, and not too thick ; say half an inch square, and not more than the eighth of an inch in thickness ; otherwise the fixing re-agent may not penetrate throughout the tissue, or may take a long time to do so. Also the dehydration may be incomplete or slowly accomplished.

When, however, the material has been long enough in absolute alcohol it should be placed in Oil of Aniseed. This, even in the cold, penetrates rapidly, so that the tissue is quite translucent in an hour or less. If, however, the bottle containing the oil be put into an incubator so as to raise its temperature to about 100° Fahrenheit (or a little less), the "clearing" will be complete in twenty minutes. The tissue may then be taken out of the oil and placed at once in the bath of melted paraffin. Before doing this, superfluous oil should be removed by pressure between the folds of a piece of filter-paper.

When it is desired that a very rapid preliminary examination should be made, which however shall not preclude the use of classical methods in a more deliberate way later on, it is well to remember Kühn's instructions. He has advised that the dehydrated tissue be put into the Oil of Aniseed as above, and when saturated with the oil, be placed upon the plate of a freezing microtome. In a few moments, by means of the ether spray, the oil and tissue are frozen hard, so that sections can be cut, freed from oil by alcohol, and then stained and mounted in the usual way. These sections will not be nearly as perfect as those made from tissue imbedded in paraffin, but they are often very instructive, and show sufficient detail to enable a diagnosis to be made at once. Certainly the preparations made in this way are as good as those which used to satisfy us in the days when the "frozen-gum-and-sugar" process was the only one used in pathological research.

And in any case, whether they are decisive or not, after taking a few sections from the surface of the piece of tissue in this way, the remainder may be allowed to thaw, and then can

be put into the paraffin bath, and sections afterwards made of any degree of thinness. Thus the use of Oil of Aniseed not only makes it possible to considerably shorten the time required for "clearing," but it also permits of the rapid examination of a few sections by the freezing method. Often this is all that is required: but it is much more satisfactory to imbed in paraffin, and make careful sections of the mass. I have found that mineral naphtha is the best solvent for removing the paraffin from the sections, but have also discovered that this article varies greatly in quality. That purchased from some dealers sets up violent diffusion-currents in the fluid when the section is immersed, and seems too volatile and thin. Other samples, obtained elsewhere, have not this objectionable quality. The kind supplied by Messrs Southall, of Birmingham, is excellent in every way, and moreover has not the disagreeable odour noticed in naphtha bought elsewhere. From the naphtha the sections are passed through absolute alcohol, and then stained suitably. When superfluous colour has been got rid of by washing, the sections are again brought into alcohol to dehydrate them for mounting in Canada Balsam. From the alcohol I pass them into *Oleum Fœniculi*, which I find an excellent clearing agent, and one which combines readily with the Canada Balsam. It is convenient to use it in the following way. Take a clean cover-glass, and by means of forceps immerse it in the *Oleum Fœniculi*, and with a mounted needle guide the floating section on to the glass. Then lift gently from the oil, and wipe carefully the cover-glass (on the side unoccupied by the section) with a clean soft rag. It will be found quite unnecessary to remove any oil from about the section with blotting-paper, as the Oil of Fennel is very volatile, and evaporates to dryness in a few minutes. In fact this volatility is its most useful property; for it will be found that by the time the under surface of the cover-glass has been wiped, the upper surface with the section thereon is partially dried, and just ready for mounting. A drop of Canada Balsam being let fall on the section, it can then be permanently mounted.

Thus by using Oil of Anise before the paraffin bath, "clearing" is much hastened, and the freezing method can be practised; whilst the use of Oil of Fennel to clear the sections before mounting also shortens the time which must be given to this final operation. Oil of Fennel also possesses the advantage of not washing out the aniline colours.

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## REVIEWS.

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### ATLAS OF URINARY SEDIMENTS.\*

Nor long ago the Atlas of Urinary Sediments, by Dr. Hermann Rieder, appeared in Germany. This work was at once recognised as a standard on the subject with which it treated. For some years previous Messrs. Griffin had formed the idea of issuing such an atlas, knowing that a long-felt want for such a work would thus be supplied. When therefore Dr. Rieder's Atlas was published the project of translating it into English was at once conceived, as it was obvious that the work was one of exceptional value and would meet every want in this country. Such is the history of this Atlas. That the English edition comes up in every way to the most exacting requirements there can be no doubt. The plates, of which there are thirty-six, are exquisitely printed, each as a rule shows several microscopical fields representing crystals, casts, bacteria, moulds, in fact every deposit or object met with in the urine. The plates are about as true to nature as it is possible to have them: they show none

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\* Atlas of Urinary Sediments. By Dr. Hermann Rieder and A. Sheridan Delépine, M.B. London: Charles Griffin and Co.

of the hardness or artificial appearances which generally mar the majority of illustrations of urinary sediments as given in the ordinary manuals of clinical medicine. In the case of organisms, they are represented as stained. It is not easy where all are good to pick out any particular plate for special reference, but we may be permitted to mention plates xxvii. and xxviii. showing different forms of casts; plate xxii. showing different crystals and cells; the moulds and yeasts represented in plate xx.; and lastly, all the illustrations of uric acid.

The latter half of the book consists of a description of the various sediments, parasites, etc., represented in the plates, together with the clinical chemistry of their presence in the urine, and in the case of animal parasites, bacteria, etc., a full account of the diseased conditions of which their presence is evidence.

The first portion of the second part goes into some general details as to urinary examination and methods. This is followed by a very full description in particular of the various substances figured in the plates. At the same time the general view of the subject is never lost sight of, and thus we have a valuable outline of the Pathological Chemistry of the urine in the widest meaning of the term. Under the head of Organised Sediments there is given a table of the different forms of epithelium met with in the urine. This strikes us as being of much use as there is often a lack of concise information on this subject in ordinary books. There is little to criticise adversely. We notice that in the description of Jaffe's test the chlorinated lime is directed to be added drop by drop till the colour ceases to deepen. We have found that the whole test may fail by the bleaching action of excess of the chlorinated solution. The work is one of unquestionable value, especially to those engaged in teaching clinical medicine.

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**THE DISEASES OF CHILDREN.\***

THIS book forms one of a series of Griffin's Medical Pocket Books, and is intended for the use of students taking up the clinical study of pediatrics, and the authors have therefore endeavoured to make the book as far as possible a clinical manual, and for this reason the subject of diagnosis has been made the most important, and questions of pathology have only been discussed so far as is necessary for elucidation. Another point is, that those diseases which more particularly affect children have been given prominence while others common to them and adults do not come in for so much consideration. The usual preliminary information relating to height, weight, and dentition, are much the same as in all other works on the same subject, while feeding and general therapeutics do not call for any special mention.

We do not exactly understand why birth paralyses should appear in Chapter x., the heading of which is Diseases of the Newly-born Child, while Chapters xvii. and xviii. are devoted to the description of Diseases of the Nervous System, functional and organic respectively. We also fail to find any account of Friedreich's disease, although the authors give as their reason, that Friedreich's ataxia being a disease of young persons does not require more than mention by name. Many of the descriptions are extremely short, too short in fact to be of much use, though others are clearly given. There are several fairly good illustrations of different conditions, such as hydrocephalus, tetany, rickets, etc.

The work in no way professes to be original, being as a matter of fact somewhat of a compilation, but as many compilations are useful it may be said with certainty that this book will prove

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The Diseases of Children. A Clinical Handbook. By George Elder, M.D., and J. S. Fowler, M.B. London : Charles Griffin and Co.

of value to those who require a connected introductory account of diseases of children. It is after all, notwithstanding many obvious objections, an eminently practical manual.

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#### AIDS TO THE ANALYSIS OF FOOD AND DRUGS.\*

IN issuing a second edition of this work the author has added a considerable amount of new material and has brought it thoroughly up to date. The book is one which strikes us as being of much greater use than its somewhat dry title would lead the student of medicine to expect. While much if not all of the information it contains may be obtained in works on organic chemistry, there is no doubt that a smaller work is often more handy. Thus the subject of milk may be taken as an instance. Many men go into practice with the most vague ideas on "milk," remaining in a more or less inexact form from the class of Physiological Chemistry. In practice it is often necessary to have some practical knowledge of the subject. Such information will be found in this little work. We are glad to be able to recommend it to the general practitioner as well as the more technical reader.

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#### ASEPTIC SURGERY.†

SOME time ago we had the pleasure of reviewing the first edition of this work, and then formed a high opinion of its value and

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\* Aids to the Analysis of Food and Drugs. By T. H. Pearman. Second Edition. London : Baillière, Tindall, and Cox.

† Aseptic Surgery. By Charles Barrett Lockwood, F.R.C.S. Edinburgh and London : Young J. Pentland.

merits. We are not therefore, surprised that a new edition has been speedily called for, as we are certain that the book is one of considerable worth and has secured an acknowledged place. It is not that the work is deep, or that it can be styled a text-book. It is its simplicity and clearness which gives it weight, and as a succinct account of the principles of wound infection and the necessary steps to prevent it, Lockwood's "Aseptic Surgery" will be read with much advantage.

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#### SKIAGRAPHIC ATLAS OF FRACTURES AND DISLOCATIONS.\*

THIS volume contains 80 reproductions of skiagrams taken by Dr. Mackintosh at the Glasgow Western Infirmary. The idea of publishing the pictures in book-form is a good one, and ought to be widely appreciated. It is unnecessary to single out special prints for notice, for all the reproductions are good and show well the essential points of each particular lesion. To the student reading the subject of fractures and dislocations in his ordinary surgical text-book, Dr. Mackintosh's book should prove to be of the greatest possible use. In conclusion, we must congratulate the publisher upon the admirable way in which the plates have been printed.

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\* Skiagraphic Atlas of Fractures and Dislocations, with Notes on Treatment for the use of Students. By Donald J. Mackintosh, M.B. London : H. K. Lewis,

### MATERIA MEDICA AND THERAPEUTICS.\*

THIS already well-known work has been issued in a new edition in order to bring it up to date with the recent changes in the British Pharmacopœia. The various alterations are carefully pointed out, especially the greater details respecting the chemical and pharmaceutical relations of the individual drugs. The section on Anæsthetics has been considerably revised and enlarged.

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### DICTIONARY OF MEDICAL TERMS.

#### ENGLISH-FRENCH.†

THIS book supplies a want which has been felt for a small and handy dictionary of medical terms. It will be obvious that the book will be of greater use to our *confrères* than to us, and we have little doubt that its value will speedily be recognised by them. There are many inaccuracies in the text.

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### GOLDEN RULES OF PSYCHIATRY.‡

THIS is No. V. of the Golden Rules Series and contains much practical information. The chief points in the diagnosis of Mental Disorders are given, and also the basis of prognosis and the procedure for certifying is given in a clear and practical manner. We strongly recommend all practitioners of medicine to have a copy.

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\* *Materia Medica and Therapeutics.* By J. Mitchell Bruce, M D. London : Cassell and Company Limited.

† *Dictionary of Medical Terms. English-French.* By H. de Méric. London : Baillière, Tindall and Cox.

‡ *Golden Rules of Psychiatry.* By James Shaw, Bristol : John Wright and Co.



### New Books, etc., Received.

From the Scientific Press—

Burdett's Hospitals and Charities, 1899.

A Handbook for Nurses. By J. K. Watson, M.D.

From H. K. Lewis—

Transactions of the Dermatological Society of Great Britain.

Calendar of the School of Medicine of the Royal College, Edinburgh.

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The Schott Methods of the Treatment of Chronic Diseases of the Heart. By W. Beezly Thorne, M.D.

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THE  
BIRMINGHAM MEDICAL REVIEW.  
NOVEMBER, 1899.

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ORIGINAL COMMUNICATIONS.

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THE BRADSHAW LECTURE  
ON  
THE CAUSATION OF FUNCTIONAL HEART  
MURMURS.

*Delivered before the Royal College of Physicians, of London,  
on November 2nd, 1899.*

BY ARTHUR FOXWELL, M.A., M.D., CANTAB.,  
FELLOW OF THE COLLEGE;  
PHYSICIAN TO QUEEN'S HOSPITAL, BIRMINGHAM; LATE EXAMINER IN  
MEDICINE AT THE UNIVERSITY OF CAMBRIDGE; PROFESSOR OF  
THERAPEUTICS AT MASON UNIVERSITY COLLEGE, BIRMINGHAM.

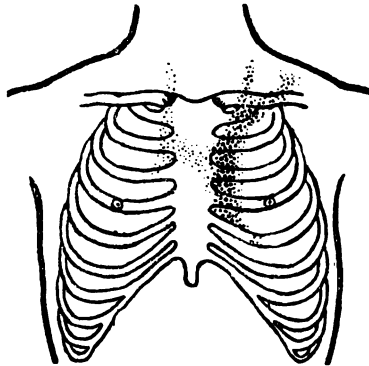
Mr. President and Gentlemen,

When Sir Samuel Wilks graciously surprised me with the request to deliver this lecture I did not hesitate to accept the honour, but for some time lay in doubt as to my subject. In the end I came to think that I should be most likely to have matter worthy your acceptance if I spoke concerning things in which I was most interested. Hence the title of this lecture.

The etiology of the so-called inorganic cardiac murmurs has always seemed to me to be one of the *opprobria medicinæ*. These murmurs are heard by each one of us almost daily, and yet to none can the vague and varying statements of their causation have ever proved satisfactory. During the last 16 years their etiology has been with me a subject of much thought and investigation. At last I feel quite clear in my own mind as to its nature. But to convince you is a different, more arduous, and far more important matter—one which, I perceive, may well

be beyond me and one to which I now address myself with a full sense of its difficulty.

In the short space of one lecture I find it impossible to consider duly all these murmurs; I shall therefore confine myself to the commonest and yet most obscure—I mean the murmur heard over the second and third left spaces which, for the sake of brevity, I shall speak of as the pulmonary murmur. This murmur is systolic in time and is never accompanied by a diastolic element. It is best heard (Fig. 1) over the second and



AREA OF PULMONARY MURMUR.

FIG. 1.

Area of audition of the murmur.

third left spaces close to the sternum, and is best conducted thence up and out towards the left shoulder, travelling along the arc of a circle which has the axilla for its centre. It is also sometimes well heard in the fourth left space and may reach the apex, but it does not increase in loudness as it approaches this point, as do the murmurs of mitral incompetence and aortic stenosis. It may cross the sternum, appearing on the right side from the clavicle to the third rib, but it loses greatly in loudness in doing so and never travels far in this direction. When heard to the right of the sternum it is most evident in the second space but may even reach up into the vessels of the neck. In character it is loud, harsh, and blowing, and gives the impression of having a superficial origin. It is never rumbling or purring, thus markedly differing from the murmur of organic pulmonary

stenosis. A notable characteristic, considering its harsh loudness, is its want of travelling power; this is far less than in the case of organic murmurs generally, or, indeed, than in that of the functional murmur arising at the mitral orifice. It is not as fugitive as other functional murmurs, but remains with fair constancy till it vanishes for good, though, as the conditions producing it ameliorate, it sometimes requires a few sharp steps, or the supine position, to develop it. As a rule it is more evident in the supine than the erect posture, especially if it be listened for immediately upon the patient's lying down before the circulation has been able to accommodate itself to its new relation to gravity. So much is this the case that it is doubtful if it be not the dynamic rather than the static change in position which is the more important element in its intensification. This is further borne out by the fact that any quick exertion, even a few sharp steps, will increase it as easily and as much as lying down. At the same time anatomical considerations induce the belief that the supine attitude conduces to its production, as will be seen when the question of dulness is discussed.

Accompanying this murmur we have the following *signs* :—

A. The apex is pushed out and up, in a moderate instance lying beneath the lower part of the fourth space a little to the left of the nipple line. I find from an analysis of 23 cases in which this murmur, *and this murmur alone*, existed, the exact spot of the average apex was the middle of the fifth rib one-fifteenth of an inch within the nipple line. In another series of cases which I published in 1895\* I similarly found that the apex was situated at the lower edge of the fifth rib and in the nipple line, so that the position was very nearly the same in the two series. (Fig. 2). In the supine position this removal of the apex up and out is still further increased. Such apical displacement roughly corresponds to a movement along the arc of a circle the centre of which is the aortic valves, probably the most fixed portion of the heart. This only refers to uncomplicated cases of pulmonary murmur; if a mitral or tricuspid be

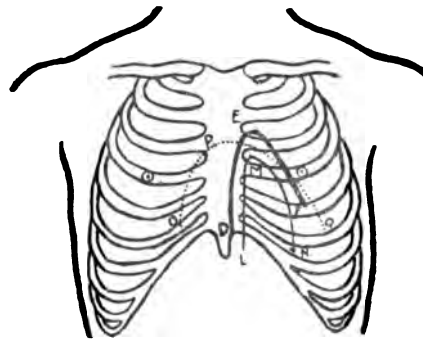
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\* "Essays in Heart and Lung Disease," p. 339.



B. The dulness† is little, if at all, increased to the right (Fig. 2); in the same series I find that it is only three-tenths of an inch to the right of the left edge of the sternum, and in my former series it did not quite reach the mid-sternal line. But the vertical dulness is much raised; instead of being at the upper border of the left fourth cartilage at its junction with the sternum it reaches to the middle of the third cartilage. In the earlier series it reached even higher, extending into the lower part of the second space.

This peculiar outline of cardiac dulness is characteristic of the debilitated heart and contrasts strongly with that of any heart enlarged by inflammatory disease of the pericardium or valves. Such difference is well exemplified in the accompanying diagrams (Figs 4 and 5) where A B C = outline of



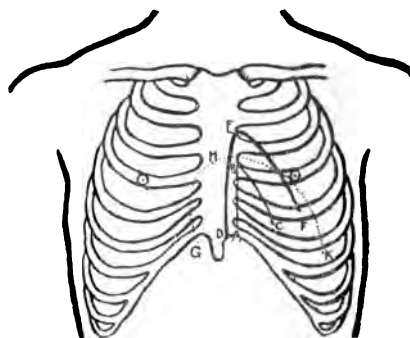
DEF = OUTLINE OF HEART IN DEBILITY.  
LMN = " " " " AORTIC DISEASE.  
OPQ = " " " " ADHERENT PERICARDIUM

FIG. 4.

normal heart, D E F = that of the heart in debility, G H K of a heart with advanced mitral disease, L M N in a case of aortic disease, and O P Q that of pericardial adhesion. This vertical dulness changes considerably with posture, always rising still

† This always refers to the superficial or absolute dulness. I have elsewhere stated my reasons for preferring this. Op. cit., p. 328.

further when the patient is supine and at the same time extending more to the left of the sternum.



DEF = OUTLINE OF HEART IN DEBILITY  
 ABC = " " " " HEALTH  
 G/K = " " " " MITRAL DISEASE

FIG. 5.

C. Another characteristic sign is the pulsation in the second, third, and fourth left spaces; this pulsation is evident and palpable, has a vermicular movement, and extends from above downwards and outwards towards the apex; occasionally it is accompanied by a feeble thrill of slow and large vibrations, but this never approaches the strength and rolling power of the thrill accompanying organic pulmonary stenosis.

D. Usually there is a slapping accentuation of the second sound; this often heralds the appearance of a murmur and lasts for some time after it has gone. Evidently it is produced by a less degree of the same conditions which originate the murmur.

E. There is often when lying supine an indefinite pulsation in the veins on the right side of the neck; this is not usually present in the erect posture, and disappears when the peripheral venous stream is cut off.

F. The pulse varies considerably; it is nearly always short and ends abruptly, as if the ventricle had suddenly struck work;

the onset, also, is too abrupt; the amplitude of the wave during its short existence is usually small, but by no means necessarily so; its diameter may be of quite average size, though the pulse would never be described as large or full. At the same time, it is the abruptness of its onset and ending which is most characteristic.

The pulse wave has a trembling unevenness which can be best described by the adjective "thrilly," and suggests to the mind a ventricle which is labouring and has to perform its systole with a succession of abortive contractions instead of a long and steady one. An attempt is made to make up for this feebleness of individual effort by an increase of rate. In one case which has come under my notice, with the onset of debility, the pulse-rate has gradually risen from 60 to 80; it is rare for patients with pulmonary murmurs to have a rate below 80. The tension of the impulse is sometimes high and the radial may feel hard during the stroke; but it is rarely correct to speak of the tension generally as high, for the vessel nearly always collapses and feels empty between the beats. Even this modified high tension only occurs in comparatively slight cases and in all the pulse gives the impression that a smaller cylinder of blood than usual is being sent into the aorta at each systole.

Of the *symptoms* which occur with this condition the chief and most evident is dyspnoea on exertion, especially if this exertion be in any way sudden, such as that of running upstairs or vivid emotion. Exertion guardedly approached and slowly undertaken may be performed without any dyspnoea. But no exertion can be long maintained; weariness, physical and mental, comes very quickly. Palpitation, peevish irritability, and dyspepsia are common. The skin is dull, toneless, and pallid. This pulmonary murmur very often occurs during adolescence and is especially common in chlorotic girls. On the other hand it is very rarely found after 60 years of age, but it not seldom appears between the ages of 40 and 50. When it arises towards middle life it is most difficult to remove; when it occurs in adolescence without anæmia it resists treatment more than when anæmia is present, it vanishing most speedily when chlorosis exists.



The patients often give you a history of cardiac strain—several of mine have been sprinters on the cycle track or running path, or else they have returned to full work too soon after an exhausting illness, or they have been subjected to prolonged anxiety or mental strain. Most commonly their condition is the result of a gradual lowering of the constitutional state—they have slowly fallen below par.

In examining the heart *in situ after death* we find the situation of the apex changed as was indicated during life; there is no enlargement of the right or left auricle, nor does the right ventricle extend unduly to the right; but sometimes it forms the apex and may quite hide the left ventricle. But what is most interesting is the enlargement upwards of the right ventricle; this dilatation is almost entirely confined to the conus arteriosus. On removing the carapace the conus not only bulges unduly forward but is wider than normal; moreover, the pulmonary artery is similarly widened and bulging forward. Here is evidently to be found the explanation of the increased vertical dulness on the left of the sternum just as we similarly find it on the *right* of the sternum in cases of aortic dilatation from chronic aortitis. The stretching of the conus carries the pulmonary valves upwards, and in 20 cases of exhausting disease, reported by various observers, they were found on the average under the second costal cartilage. These valves after death are usually found higher up than was the upper limit of absolute dulness during life.

The following additional cases further exemplify this condition. The *post-mortem* statements were made by Dr. Douglas Stanley, our pathologist, and the cardiac outlines during life were taken from the clinical notes of each case, such notes being made by different physicians and house physicians.

Case 1.—The patient was a man, aged 39 years. Death resulted from cholangitis and duodenal cancer. After death the pulmonary artery was found to reach up to the lower edge of the second cartilage and it extended from the mid-sternum for one and a half inches to the left of this bone (= width of two and a quarter

inches). The pulmonary valves occupied the middle of the second space. The apex was situated at the upper border of the fifth rib just inside the left vertical nipple line.

Case 2.—The patient was a man, aged 36 years. Enteric fever was the cause of death. After death the pulmonary valves were seen to lie beneath the lower edge of second left cartilage. The apex was situated beneath the fifth rib, one eighth of an inch internal to the left vertical nipple line. During life, according to the only note made in this case, when the patient was admitted to hospital, the apex beat reached to the fourth space, half an inch internal to the left vertical nipple line. The vertical dulness was at the upper border of the fourth cartilage and the right dulness at the left edge of the sternum. No murmurs were heard.

Case 3.—The patient, a male, aged 19 years, died from purpuric anæmia. During life the apex beat reached to the lower border of the fourth space. There was right dulness at the left edge of the sternum and vertical dulness at the third upper border of the cartilage. Soft systolic murmurs were heard at the apex beat and in the pulmonary area. After death the apex was in the fourth space and left vertical nipple line, the right margin was two and three-quarter inches from the mid-sternum, and the pulmonary valves lay under the second cartilage.

Case 4.—The patient, a man, aged 47 years, had suffered from cirrhosis of the liver with hæmatemesis. During life the apex beat was in the fourth space, one and a quarter inches without the left vertical nipple line. There was right dulness at the left edge of the sternum and vertical dulness at the lower border of the second space. A systolic murmur heard in the first four left spaces was most marked in the second and third spaces. After death the apex was in the fourth space, three and a half inches from the mid-line. There were right dulness one and a quarter inches from the mid-line and vertical dulness at the lower border of the second space. The left pleura was very widely adherent.

Case 5.—The patient, a male, aged 16 years, had died from anæmia. After death the apex was in the fourth space and left

vertical nipple line. The heart reached one and a quarter inches to the right of the mid-sternum at the fourth cartilage. The pulmonary valves lay beneath the middle of the left first space. Before death the apex beat was slightly internal to the left vertical nipple line in the fourth space. Systolic murmurs were heard at the apex beat and in the pulmonary area, and a venous hum was audible in the neck.

Case 6.—The patient had died from phthisis. The pericardium was not at all adherent on the right but it was universally so on the left. The sac reached from the first left cartilage to the position of the apex beat in the fourth space. The left ventricle was not enlarged. The apex beat was formed by the right, which reached some eighth of an inch below the left. The posterior pulmonary valve was one-third of an inch above the anterior aortic; the anterior pulmonary valve was half an inch above its posterior fellow, and therefore five-sixths of an inch above the aortic valves. This case shows in a marked manner that the anterior wall of the pulmonary artery rises more than does the posterior wall.

The foregoing is a brief statement of the chief conditions found during life and after death in cases of debilitated heart. They are so frequently associated that there must be a causal relationship between them, and any explanation of one should also help to explain the rest. An explanation of the cause of the pulmonary murmur is the more likely therefore to be the true one if it also explains the origin of the other conditions described. What, then, is its explanation?

I.—It cannot be due to the quality of the blood for the following reasons:—

1. In many cases where this is greatly changed there is no murmur. The following may be cited as a few examples:—

Case 7.—The patient suffered from chlorosis. Red corpuscles, 3,700,000; hæmoglobin, 65 per cent., with slight poikilocytosis. No murmurs were heard.

Case 8.—A man, aged 61 years, was the subject of carcinoma of the stomach. Red corpuscles, 3,625,000; hæmoglobin, 62 per cent. No murmurs were heard.

Case 9.—The patient was a male who suffered from phthisis of both lungs. Red corpuscles, 2,910,000; hæmoglobin, 45 per cent. The corpuscles varied much in size. No murmurs were heard.

Case 10.—A man, aged 21 years, had hectic fever after operation. Red corpuscles, 3,600,000; hæmoglobin, 72 per cent. No murmurs were heard.

Case 11.—The patient was a male who was the subject of subpectoral abscess. Red corpuscles, 4,000,000; hæmoglobin, 68 per cent. The cells were very pale: there was some poikilocytosis. No murmurs were heard.

Case 12.—The patient, a female, aged 18 years, suffered from gastric ulcer and hæmoptysis. Red corpuscles, 2,470,000; hæmoglobin, 20 per cent. There were many microcytes and some poikilocytosis. No murmurs were heard.

Case 13.—The patient, a man, aged 40 years, was the subject of plumbism. Red corpuscles, 3,600,900; hæmoglobin, 40 per cent. No murmurs were heard.

Case 14.—The patient, aged 24 years, suffered from Hodgkin's disease. Red corpuscles, 4,770,000; white corpuscles, 10,000; hæmoglobin, 33 per cent. No murmurs were heard.

Case 15.—The patient was a man, aged 35 years, who suffered from malaria. Red corpuscles, 3,820,000; hæmoglobin, 48 per cent.; there was some poikilocytosis. No murmurs were heard.

Case 16.—The patient, a man, aged 41 years, suffered from pernicious anæmia. Red corpuscles, 1,320,000; hæmoglobin, 30 per cent. There were many microcytes, some megalocytes, and much poikilocytosis. No murmurs were heard. This man was an in-patient, and had been examined many times.

Case 17.—The patient, a female, aged six years, was the subject of abdominal abscess. Red corpuscles, 3,814,200; hæmoglobin, 55 per cent. No murmurs were heard.

2. Again, in addition to being absent when the blood is much deteriorated, the murmur frequently exists when there is no change in the blood. And in this regard I would ask you to note that whilst many of Class 1 were in-patients and lying in bed, yet no example of the present class could be obtained from

such cases. This point I shall discuss later, but I would ask you to bear it in mind, for in my judgment it is strong evidence that the murmur is due to a special form of cardiac strain. Amongst out-patients the following are examples.

Case 18.—The patient, a youth, aged 18 years, convalescent from a long attack of typhoid fever, was up and about. Red corpuscles, 4,610,000; hæmoglobin, 82 per cent. There was much poikilocytosis. A pulmonary murmur was well heard both when the patient stood erect and (much louder) when he assumed the supine position.

Case 19.—The patient was a woman, aged 40 years, who suffered from debility. Red corpuscles, 4,500,000; hæmoglobin, 81 per cent.; slight poikilocytosis. A pulmonary murmur was well marked.

Case 20.—The patient, a female, aged 20 years, the subject of debility, was under treatment for four months. Red corpuscles, 5,400,000; hæmoglobin, 81 per cent. There were a few microcytes (two examinations were made). A pulmonary murmur was heard on each of three examinations.

Case 21.—The patient, a girl, aged 17 years, suffered from debility. Red corpuscles, 4,855,000; hæmoglobin, 86 per cent. A pulmonary murmur was well marked.

Case 22.—The patient, a male, aged 21 years, suffered from debility. Red corpuscles, 5,100,000; hæmoglobin, 100 per cent.; the cells were quite normal. A pulmonary murmur was only heard when the patient was in the supine position.

Case 23.—The patient, a youth, aged 18 years, was the subject of debility. Red corpuscles, 5,400,000; hæmoglobin, 94·5 per cent. (the mean of four examinations). A pulmonary murmur was heard when either the erect or supine position was assumed.

Case 24.—The patient, a female, aged 18 years, suffered from debility. Red corpuscles, 4,690,000; hæmoglobin, 81 per cent.; slight poikilocytosis, fairly uniform in size. A pulmonary murmur could be heard when the patient was erect or when she was supine.

Case 25.—The patient, a man, aged 20 years, was debilitated.

Red corpuscles, 5,150,000; hæmoglobin, 90 per cent. The cells were normal. There was a well-marked pulmonary murmur to be heard when the patient was lying down.

Amongst my private patients I find a considerable number of such cases, but I cannot vouch for the condition of their blood as I did not examine this. All I can say is that their appearance did not give the slightest indication of poor blood. It may perhaps be worth while to give one or two instances.

Case 26.—The patient, a man, aged 22 years, had “always gone in much for athletics.” For the last two years he had felt an “indigestion lump” behind the sternum when racing. He was fairly fit on rising in the morning, but he would soon get “all gone,” palpitation easily coming, especially after dinner. He was well set up and strongly built, and showed no sign of anæmia. The apex beat reached the fifth space and nipple line; the impulse was diffused. There was vertical dulness at the third space and right dulness at the left edge of the sternum. In the second and third left spaces was visible pulsation with a loud systolic murmur. This was well conducted out and up into the first space and towards the shoulder. It was also heard in the fourth and fifth spaces, nearly reaching the apex.

Case 27.—The patient, a man, aged 23 years, had strained his heart at Cambridge, three years previously, at football. He gave up active exercise, but strained his heart again at Folkestone a year later whilst cycling. Eighteen months afterwards his heart again went wrong when tea-planting in Ceylon, his symptoms being dyspnoea and cold extremities. He sought my advice for violent earache, from which he had suffered for three days. He had no sign of anæmia and was well-built. The apex-beat was in the fifth space, half an inch outside the left vertical nipple line. There was vertical dulness in the third space and right dulness at the left edge of the sternum. A short systolic murmur was heard in the second space on lying down.

Case 28.—The patient was a man, aged 27 years. Formerly he had been very athletic, but when seen he was depressed, neurotic, and easily subject to palpitation. He did not look anæmic, but his blood was not examined. He came to be

tested for insurance. The apex beat was in the normal situation, the impulse slapping and thumping. The second pulmonary sound was accentuated. There was a systolic murmur, which was best heard in the second left space, half an inch from the sternum, thence into the first space and out to the shoulder, also feebly in the third space, not over or to the right of the sternum. As a rule no murmur was heard in the third and fourth left spaces, but an occasional systolic murmur was heard at, and a little outside of, the apex beat. There was vertical dulness at the third cartilage and right dulness at the mid-sternum.

Case 29.—The patient, a youth, aged 17 years, had never been very robust, but he entered into games well. There was no evidence of anæmia. He sought advice because he did not feel up to his work. The apex beat reached the fifth rib and the left vertical nipple line. There was vertical dulness in the third space and right dulness at the left edge of the sternum. A systolic murmur sprang up in the second, third, and fourth left spaces on sharply walking or on lying down.

3. If it were due to changes in the blood then similar murmurs should arise in all parts of the body to a greater or less extent, especially where there are angles or sharp curves; but there are no such murmurs.

4. Immediately after severe hæmorrhage such generalised murmurs do arise, these cease in a day or so when the vessels are again sufficiently distended with (what must be) hydræmic blood, but later, if debility sets in as a result of the hæmorrhage, the pulmonary murmur appears and persists till the patient is restored to his customary vigour.

5. Persons convalescing from exhausting diseases—*e.g.*, typhoid fever—whether suffering from anæmia or not, may have no murmur so long as they are confined to bed, but when sufficiently recovered to be up and about a murmur not seldom arises. An instance of this is Case 18, but a very interesting and to my mind more convincing example is the following:—

Case 30.—A married woman, aged 29 years of age, was admitted to hospital with enteric fever. Seven days prior to

her discharge, before she had been allowed up, the following was the note made of her heart :—The apex beat reached the fourth space, half an inch outside the left vertical nipple line. There was vertical dulness over the upper border of the third left cartilage and right dulness to the right of the left edge of the sternum. A harsh systolic murmur was heard at the apex beat and a short soft whiff at the beginning of systole in the second left space. Three weeks later, after the patient had done her housework for a fortnight, another observer, quite ignorant of the previous note, made the following independent observations :—The apex beat reached the lower border of the fourth space in the left vertical nipple line. There was vertical dulness at the upper edge of the third left cartilage and right dulness a quarter of an inch to the right of the left edge of the sternum. There was no apical systolic murmur, but a well-marked systolic murmur in the second left space which was well conducted up and out into the first ; it was also slightly heard in the third left space. It became louder on lying down. A reference to Fig. 6 explains what happened.

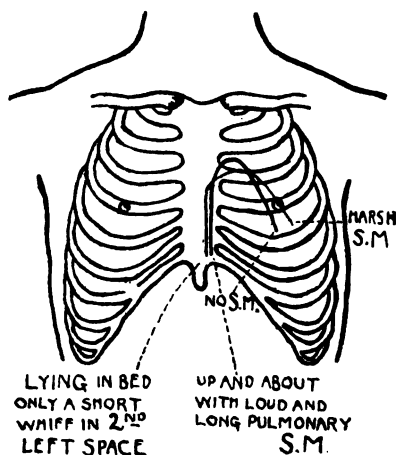


FIG. 6.

Lying in bed only a short whiff in the second left space, but harsh systolic murmur at apex. Up and about loud and long pulmonary systolic murmur, but no apical murmur.



The improvement in the general health and strength pulled the heart together; the dilated left ventricle came back to its normal size, as shown by the recession of the apex beat, and with this the mitral valve ceased to leak; but the conus was not able to withstand the strain put upon it by all the short little exertions of housewifery, hence the pulmonary murmur became much louder and the vertical dulness still further raised, although the lungs were no doubt more fully inflated than when the patient was confined to bed. The blood of this patient was not examined, as she gave no evidence at any time of anæmia, though no doubt its quality was somewhat below par on both occasions.

6. By a method presently to be described various fluids were forced through the human heart with a view to determine whether changes in the circulating medium made any differences in the sounds produced.

*Experiment 1.*—The first heart experimented upon was that of a woman, 36 years of age, who died from gangrene of the leg with granular kidneys. The pericardium was healthy but the whole heart was enlarged. The right ventricle was dilated and its wall was chiefly composed of fat, its muscular layer being extremely thin ( $\frac{1}{8\frac{1}{2}}$  inch.) The left ventricle was dilated and hypertrophied, the wall being three-quarters of an inch thick but showing extensive fatty degeneration. The mitral and aortic valves were thickened, the aorta was atheromatous, and the endocardium was thickened and opaque. This heart, then, was peculiarly suited to increase the murmur-producing capacity of any fluid. The pericardium (parietal layer) was kept on, ordinary tap-water was first used, and the sounds at the base of the heart were carefully noted. These were unchanged when a saline solution (specific gravity 1.045) was passed through. They still remained unchanged when a thick solution of boiled starch, containing lumps half an inch square and one-sixteenth of an inch thick, was employed. It was particularly noted that even if several of these lumps passed together yet no change in the sounds occurred. Yet if pressure were made by

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the stethoscope a murmur appeared and remained unchanged in quality on again passing the three fluids through. A window was then cut in the parietal pericardium over the pulmonary artery and conus, through which these bulged, and the same three fluids were used. With each systole a short murmur was heard and this remained the same whichever fluid was used. This experiment shows that certain changes in the circulating medium produce no change in the sounds, but certain changes in the shape of the containing apparatus induce a murmur.

*Experiment 2.*—This experiment was made upon a heart from a healthy man, aged 32 years, who died from fractured base. The heart was healthy. (a) With tap-water. A soft murmur was heard over the aorta as well as over the pulmonary artery. This was unexpected and in seeking for the cause a portion of the pulmonary artery next the aorta was found to be bulging and uncovered by pericardium. The torn pericardium was brought together and sewn up over the bulge. After this was done no murmur was heard. (b) Salt solution (specific gravity 1035) was next passed through. The sounds remained unchanged. (c) A solution of milk and borax (specific gravity 1056) was used. Again there was no change in the sounds. (d) A solution of starch (specific gravity 1005). No murmurs were heard, but the sounds generally were deadened, and it was more difficult to produce a murmur by locally compressing the conus or pulmonary artery. (e) A window was now made in the pericardium over the pulmonary artery and conus, allowing these to bulge through it. With the same starch solution a short soft murmur was heard, but this could not be detected with the stethoscope on the aorta. (f) Tap-water was now used and the murmur became louder and could be detected over the aorta. (g) The pericardium was entirely removed; tap-water was again used; no murmur could be detected. In this experiment it must be noted that starch solution tended to prevent the production of a murmur. But the difference between the viscosity of tap-water and a starch solution—which was made as thick as we could pass through the tubing—is so many times greater than that which

could arise between varying states of the blood that much stress cannot be placed upon it. Still, so far as it goes, it is against rather than for the hæmic origin of the murmur, as the great excess of white corpuscles in leukæmia must surely increase the viscosity of the blood in these cases, and therefore militate against the production of the murmurs which are usually heard in this disease.

7. It has been suggested that as in anæmia the corpuscles are lighter than normal they may occupy the upper semi-circumference of an artery and so tend to produce a murmur by their friction against the sides of the vessels. But in anæmia the specific gravity of the blood serum is also lessened, and there is no evidence to show that the two diminutions do not proceed *pari passu*, and hence there would be no tendency for the corpuscles to deviate from their usual axial position. Moreover, even if true, this could only account for the murmur in cases of anæmia and not for that which arises in other forms of cardiac debility.

For these seven reasons I think it impossible that the murmur can be due to changes in the blood.

II.—If the murmur be not due to a change in the contained fluid it must arise from some defect in the containing apparatus. As its area of audition is localised it would seem that the change must be also localised. That is, it must occur in the heart or some one or more of the great vessels close to the heart.

1. Is it due to regurgitation through the mitral orifice? Against this are these facts: (a) Its area of audition is very different from that of an organic mitral lesion; it is feebly, if at all, heard at the apex and is never conducted from the apex to the axilla. When an organic mitral murmur is heard in the second and third left spaces it is evidently a murmur conducted from the apex with gradually lessening intensity; it is true it occasionally becomes a little louder at the base, just as an aortic regurgitant murmur springs up again at the apex, but even then it is not better heard on the left side than on the right, if as well. No one has heard the murmur of organic mitral regurgitation in

the second and third left spaces only and failed to discover it at the apex or between this and the axilla. But these two spaces are the very ones in which the murmur whose origin is now being discussed is so frequently alone audible. (b) The area of dulness both in functional and organic uncomplicated mitral regurgitation is the same, and very different from that occurring in cases of uncomplicated pulmonary murmur. (c) A functional murmur does arise whose distribution is identical with that of organic mitral regurgitation and is accompanied by similar changes in the area of dulness and situation of the apex, and when it arises in conjunction with the murmur under discussion it tends to modify these in the directions indicated. This functional murmur is recognised as being due to functional mitral leakage; it is very fleeting and is softer than the pulmonary murmur, though much better conducted. It is conducted to the back in the region of the angle of the scapula; the pulmonary murmur is heard with extreme rarity posteriorly; when it is so heard it is at a point in the left inter-scapular region near the spine of the scapula. It is, to say the least, difficult so to arrange one's mind as to believe two sounds so different are due to the same cause.

2. Is it due to tricuspid leakage? Here, again, we can fortunately compare it with a murmur arising from tricuspid leakage due to back pressure in organic mitral disease. This murmur is heard over the lower part of the sternum and about equally in the third, fourth, and fifth spaces on either side of this bone; sometimes it is conducted up into the second right space and even reaches the right clavicle, but this upward conduction does not occur on the left side of the sternum. The right dulness is considerably increased but the vertical dulness scarcely at all. The apex is pushed out to the left and down rather than up. There is a distinct systolic pulsation in the veins of the neck which is best demonstrated by cutting off the peripheral flow. The indefinite undulation which may occur with the pulmonary murmur tends to be presystolic and, at any rate, cannot be definitely connected with the systole, and

often vanishes when the peripheral flow is cut off. Finally, in the tricuspid regurgitation due to mitral disease there may be hepatic pulsation, which never arises in the merely debilitated heart.

Beyond all this a purely functional murmur is sometimes heard in cases of debility which has all the characteristics I have just mentioned, and which is, so far as I know, universally allowed to be due to leakage through the tricuspid valve. Moreover, when in a debilitated subject, in addition to the usual murmur over the pulmonary valves, another springs up having the location I have just described, then the shape of the cardiac outline also changes, widening out on both sides, but not rising any further upwards. The outline takes on, in fact, the shape due to tricuspid leakage as well as that caused by dilatation of the conus. Venous pulsation also arises and we have every reason to believe that we are dealing with a fresh lesion in the shape of a failing tricuspid valve.

3. Is it due to any aortic defect? Virchow's congenital narrowing is only stated as occurring in chlorosis and must be an extremely rare event in this disease. No constriction or dilatation was noted in any case of which I have records, neither of valves nor artery. When degeneration arises in middle life, and chronic aortitis, with its roughening of the inner coat and widening of the aorta, produces a systolic murmur, the clinical signs are very different and the murmur has quite a different habitation.

4. Is it due to a defect in the pulmonary valves? Nowhere can I find in the *post-mortem* notes on individuals whose hearts before death gave evidence of the pulmonary murmur, and this alone, any statement of thickening, constriction, or erosion of these valves. Besides, the murmur differs in many ways from that of organic valvular stenosis; it is far less well-conducted, there is no true purring thrill, and the forcible heave of a hypertrophied right ventricle is entirely lacking.

(To be continued.)

## THE INFLUENZA HEART.

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DURING the last two years we have had going on before our eyes a most interesting demonstration of general pathology, which to those who are not mentally blind, should be sufficient to settle many of the problems which were much debated a few years ago, and then seemed to approach a settlement which no one at the present time would consider satisfactory.

Influenza, since its reappearance among us at the end of 1889, has illustrated many of the most remarkable peculiarities of the group of specific diseases, but instead of spreading its lessons over a century or two in time, or distributing them over a wide area of the earth's surface, from which they could be only slowly and laboriously collected, we have been able to take account of them in the course of one decade, and within the area of a single town or county.

We have seen a specific disease assume the utmost variation of form and degree of malignity without leaving room to doubt the identity of the poison. The "change of type," which fifty years ago was regarded as only a feeble explanation and defence by the older physicians then in practice of their abandonment of the bleeding, cupping, purging, and sweating methods of their earlier days—this change of type has occurred repeatedly in the course of the influenza epidemic with which we have been troubled.

The instances in which enteric fever appears to localise itself elsewhere than in the bowel so as to take on the character of a pneumonia or a meningitis are rare, and the same is even more true of other less common diseases, yet influenza has presented itself, not in individual instances only, but in whole epidemics, here as pneumonia, there as meningitis, and elsewhere as gastro-enteritis, etc.

We have been long familiar with the sequelæ of infectious diseases, so that it is generally known that rheumatic fever is often followed by endocarditis, scarlatina by nephritis, diphtheria by neuritis, etc., but it is much less commonly known that all infectious processes are endowed with the malignant power to set up inflammatory changes in the various organs and that the localisation of these changes is rather incidental than essential. Influenza has taught this lesson to us most abundantly by determining consequential inflammations in almost every organ of the body, the brain, the eye, the ear, the peripheral nerves, the lungs, heart, stomach, intestines, kidneys, pancreas, etc. In each and all of these organs inflammatory processes have been set up by the poison of influenza, and have ultimately revealed themselves when not otherwise apparent by their appropriate clinical symptoms.

I shall not attempt to determine in the absence of precise pathological data how precisely these lesions are effected. It is certain that in some cases the specific organism of an infectious disease is itself the cause of the local determination, as for example in typhoid subperiosteal abscesses, but in other cases the toxins formed locally by the pathogenic organism are carried away by the circulation and exert their poisonous effects at a distance upon the tissues, as is seen in the neuritis of diphtheria; while thirdly, the infectious process appears sometimes to favour the development or growth of an independent disease producing organism such as the diplococcus of pneumonia or the streptococcus pyogenes, as appears to be the case in the pneumonia of influenza and the otitis media of the same disease, or a still more familiar example may be found in the eruption of tuberculosis under such conditions.

However the effect may be produced the result is to give rise to a very large amount of chronic organic disease, and no one present here to-day whose professional experience has extended over the last ten years can have failed to see many patients killed, permanently disabled, or rendered invalid for long periods from this cause.

Among the more frequent sequelæ of influenza we must reckon affections of the heart. I am disposed to think that these are even more common than is suggested by the number in which the relationship can be strictly proved, for the initial attack of influenza which has set up the cardiac disturbance may pass unrecognised. This obscurity of influenza is a fact which I have no doubt will be generally admitted. I have two or three times failed to recognise influenza attacks occurring in my own person until prolonged debility and depression have suggested that the original trouble may have been more than a common cold.

The cardiac troubles of influenza may be either functional or organic. The functional troubles are alterations in the rate and rhythm of the heart's action, more often of the nature of bradycardia, less often of tachycardia.

These conditions have not been always obvious. The alteration of the pulse in many cases has been variable, or has been absent, except at certain times, or under special conditions. The patients complain of weakness or faintness on exertion, or may only express themselves as generally weak, and inapt for their ordinary business. On examination the pulse may be too quick, feeble, and small; more often it is slow, irregular, and intermittent, but is subject to great variations. In one case the irregularity was only noticeable in the early morning, and disappeared later, although the faintness was complained of all day; in other cases it seemed to be brought on by exertion, fatigue, digestion, the use of alcohol, tobacco, tea, etc. I have noticed that these patients referred their symptoms rarely to their hearts, so that without examination such cases may be overlooked.

In the other group, where there is definite organic disease, the heart is dilated, and there are all the indications of insufficiency of the left ventricle, breathlessness, œdema of the feet, etc.

Although it is convenient to divide these lesions into two groups, the distinction is probably more academic than real.

There is always more danger of the so-called functional cases



becoming organic, that is, of the neuro-motor mechanical derangement resulting in muscular degeneration. It is quite probable that the mischief always begins in the cardiac ganglia or nerves which, as being more sensitive, react most readily to the influence of the morbid poison, but when the intoxication is sufficiently intense and persistent the myocardium sooner or later becomes implicated. Dilatation is due therefore to a sub-acute myocarditis which acts by softening the wall of the heart, swelling and infiltrating its connective tissue and damaging or destroying the muscular fibre.

From a pathological point of view recovery is indeed possible, but under unfavourable conditions, where nutrition is weak and repair inactive, permanent fatty degeneration may ensue.

Looked at mechanically the dilatation of the ventricle is a disadvantage to the heart because the quantity of blood to be discharged is increased while the muscular power has become weakened by disease. After the inflammatory stage has passed away, the muscle strengthens as all healthy muscle does when exercised, and recovery takes place by the establishment of compensatory hypertrophy.

It is the business of the physician to do all in his power to promote this favourable termination.

I have met with examples of altered cardiac rhythm very frequently, in all classes and in both sexes. As already indicated, the conditions most usually observed have been those showing irregularity and intermission of the pulse. As a rule the change has not been extreme, but in some it has been sufficient to cause grave discomfort and even alarm, not only to the patient but to the medical attendant. After a perfectly simple attack of influenza I have seen such a state of the pulse supervene and persist for months, associated with pallor, debility, mental and physical depression, loss of appetite, etc., without any alteration in the size or the sounds of the heart. The most severe cases have undoubtedly been in women, and have lasted many months; but all I believe have ended in recovery. It is probable that the severity of the symptoms has been of advantage to the

patient, as it compelled rest in bed, and ensured careful supervision for the want of which many might have gone on to dilatation. There is an undoubted tendency to relapse or recurrence whenever a renewal of infection occurs. Two of my patients went through even more severe cardiac troubles after the second attack than after the first, although in both instances the second attack appeared to be of the mildest type.

I have noticed its very frequent association with gastritis, and anything that irritates the stomach has seemed to increase the heart trouble. This was particularly observed in those patients who were kept in bed, and in whom the influence of exercise was therefore absolutely excluded. The bad effects of such articles of diet as tea, whiskey, and even champagne, were noted. This state of the heart in most cases coincided with subnormal body temperature. The patients generally complained of weakness or dyspeptic troubles, more rarely of faintness.

While functional derangements of the heart of influenzal origin have been in my experience common in both sexes, I cannot recollect having seen any instance of the dilated heart in women, and I am certain that within the sphere of my observation this has been much more frequently met with amongst men.

Patients have come to me complaining of languor and debility; sometimes of faintness and giddiness; or of breathlessness, œdema of the legs and the usual indications of heart failure. The pulse has varied in character, rate and rhythm, in some being fairly regular rapid (136) and soft, in others small feeble and quick (116) in others small irregular and feeble but not altered in rate (72) in others again slow (50) and intermittent.

The enlargement of the heart was as a rule easily made out by palpation and percussion, the area extending well to the left beyond the vertical nipple line, and often beyond the anterior axillary line, so that the dilatation in these cases is unmistakeable. There has been often no murmur, but in others I have heard, but not always constantly, a systolic murmur at the apex conducted

into the axilla, and followed by an accentuated pulmonary second sound.

The urine as a rule has been free from albumen. Gastric complications have been very common, varying in intensity from a bad taste in the mouth, or want of appetite, to symptoms of more or less severe gastritis.

None of the cases have presented any difficulty in diagnosis when properly examined.

Their relationship to influenza was established sometimes by the directly observed sequence, more often by the history as related by the patient who dated his illness from an attack since which he had "never been the same man" or had "never been strong," and by the exclusion of other causes. I am certainly under the impression that cases of simple dilatation of the heart, by which I mean cases not secondary to valvular disease, have been much more common lately, and I suggest that this increased frequency is due to the intrusion of influenza as a new and very potent factor in the etiology of cardiac disease.

Of the gravity of these cases unfortunately there can be no doubt. Under appropriate treatment I have seen very remarkable recoveries take place, but I am not prepared to say that relapse will not occur, and as reinfection is not only possible but probable I feel anxious about their future.

In forming a prognosis account must be taken of the patient's age, social position and occupation, as well as the actual amount of dilatation and the other features of the case. Recovery is to be hoped for when the patient is not too old for repair to be active, and where rest and suitable treatment are not likely to be sacrificed to the necessity of earning a living. Complications of all sorts must influence prognosis, and those on the side of the stomach are most difficult to manage successfully.

Lastly I come to the question of treatment. For the cases in the first group rest, careful attention to diet, and the functions of the stomach and intestines, with small doses of iron, arsenic, and in some cases digitalis have given me satisfactory results. The indication I have observed for the use of digitalis is the

pulse-rate ; where there is persistent rapid action digitalis does good. Where the stomach has not tolerated digitalis either in mixture or pill, Nativelle's Digitaline granules have done useful service.

Where the heart is dilated I am convinced that these measures, although still holding good, do not include all that can be done for our patients, and I desire to urge very earnestly the supreme utility in these circumstances of the Schott or Nauheim treatment. I am aware that this method is the subject of a good deal of perhaps not unnatural prejudice. There has been too great a disposition to make it a panacea or heal all, not restricting it to the cases for which it was designed. But we must not allow our disapproval of the way in which the system may have been abused in certain quarters to blind us to its real value. Four years ago I went to Nauheim, and on my return carried out a series of observations, the results of which were to convince me of its usefulness.

Except in the General Hospital, I have not personally employed this treatment, as it has seemed to me to be incompatible with the performance by the patients of their ordinary duties, and that it is therefore better to send them away to some pleasant health resort, where the means exist for carrying it out. This is now the case at most of our English inland watering places, and at some at the seaside, so that there is no difficulty in finding a suitable place agreeable to the patient.

Unfortunately, I have not been always able to persuade my patients to undertake this treatment. The difficulties raised have been the expense, unwillingness to leave home, sacrifice of time, and in certain instances prejudice upon the part of the medical adviser.

I hope this paper may do something to dispel that prejudice. After four years' experience of the Schott system, I am convinced that for cases of simple dilatation of the heart no other treatment can approach it in value.

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## SECRETION:—A CHAPTER IN CELL PHYSIOLOGY.

BY E. WACE CARLIER, B.SC., M.D., F.R.S. (EDIN.)

THE methods by which the digestive fluids are produced in the various glands that pour their secretions into the alimentary canal is a subject that has attracted the attention of scientific observers from the earliest epochs. Very little was discovered however, until Ludwig demonstrated in 1851 that the activity of the salivary glands is under the direct control of the nervous system. By stimulating the lingual branch of the 5th nerve in the dog he showed that a copious flow of saliva from the submaxillary gland resulted.

Later, Rahn, working in company with Ludwig, demonstrated that a similar result followed in the parotid gland on stimulating the 7th and 5th nerves near their roots after removal of the brain. The 5th nerve is not now believed to be secretory. Subsequently Bernard discovered that the secretory nerve for the submaxillary gland came from the chorda tympani branch, and so from the facial or 7th nerve.

If the chorda tympani nerve be exposed, divided, and the peripheral end stimulated, two results follow:—namely, a copious flow of watery saliva from the duct of the gland and an enormous dilatation of the blood vessels within the gland. This dilatation is so great that scarlet blood fills the veins, and a pulse-beat may become manifest in them also.

It would seem admissible that the flow of watery saliva might be merely the result of this increased blood supply to the part, but that was proved not to be the case by the following simple experiment. A mercurial manometer was placed in the gland duct of one side of the head and a similar manometer was inserted in the carotid artery of the other side. The nerve to the gland was then stimulated, with the result that the pressure of the salivary secretion as indicated by the manometer rose to nearly double that of the carotid artery, therefore salivary secretion could be no mere result of filtration due to increased blood supply to the part; had it been a filtration phenomenon

the salivary secretion should have passed back into the blood vessels, that is from the higher to the area of lower pressure. Further, if atropine be injected into a vein and the same experiment repeated it is found that the blood vessels dilate as before, but not a drop of saliva is excreted. From this experiment it has been concluded that the chorda tympani nerve contains two sets of nerve fibres going to the gland, the one set vaso-inhibitory acting on the blood vessels and the other set secretory to the gland cells.

The sympathetic also sends nerve filaments to the salivary glands. If the sympathetic be divided in the neck and the end connected with the glands stimulated, a powerful constriction of the blood vessels, and the secretion of a small amount of viscid saliva results. This viscid saliva could not be due to the increase of blood pressure in the gland, as, owing to constriction of the vessels, the part is rendered anæmic. The amount of secretion so obtained is however very small, unless the chorda tympani has been previously stimulated, as shown by Eckhard in 1860. Eight years later it was suggested by Grünhagen that sympathetic secretion might be the result of expulsion of the gland contents mechanically brought about by contraction of the muscular fibres in and about the gland.

This idea has been recently revived by Mathews, who further maintains that the copious watery secretion induced by stimulation of the chorda tympani is to be explained in the same way, that is to say, by the mechanical pressure exerted by the dilated blood vessels upon the gland cells aided by osmosis. These conclusions seem difficult to accept, as Langley has pointed out, because the amount of saliva obtainable by mechanically squeezing the gland is much less even than the scanty sympathetic saliva; further, that constriction of the vessels of the gland at times causes no secretion, and that the total amount of saliva obtained by sympathetic stimulations is much too great for it to result from simple expression of the fluids of the gland.

More recently Langley has suggested another theory, namely, that the secretion may in reality be an osmotic process, the

so-called secretory nerves acting on the alveoli in such a way as to render them more porous to certain substances during stimulation, permitting of the passage through the alveoli of substances from the lymph into the ducts, and this, by bringing about an alteration of the molecules in the protoplasm of the cells lining the gland tubules. There may be chemical osmosis, but as he points out, such a theory is full of difficulties, and we are far from understanding the chemistry of living protoplasm.

That the activity of these glands is in some way directly under the control of the nervous system is undoubted, and it is only natural that attempts should have been made to localise a centre or centres in the brain, whose special function would be to preside over salivary secretion.

Direct stimulation of the gland cells by electricity produces no secretion, but when the nerves are stimulated either between the ganglion and the cells, or between it and the brain, secretion at once results. If, however, nicotine be injected, it is found that stimulation of the chorda tympani fails to induce secretion, though stimulation between the ganglion and the cells does so. It is known that nicotine paralyses ganglion cells, and it must be concluded from this experiment that there are at least two neurons implicated in salivary secretion, the one starting in the ganglion and ending in a flexus of fibrils round the gland cells, and the other starting in the central nervous system and having its peripheral terminations in close relation to the cells of the ganglion.

Rahn and Ludwig found that stimulation of the nerve roots produced secretion, but it was left for Bernard, followed by Loeb, Grützner, Chtapowski, and others, to localise a salivary centre in the medulla, situated somewhere near the roots of the 7th and 9th nerves.

It is well known that salivary secretion is a reflex act, and that it can be induced after removal of the brain by placing sapid substances in the mouth, but salivation is also affected by stimulation of almost any afferent nerve.

Stimulation of the sciatic nerve may produce a flow of saliva ;

sight of food, especially of acid substances, reflexly induces a copious flow; a well-known example of this is the result of exhibiting a lemon to the musicians in a brass band, when owing to reflex stimulation of their salivary glands through the optic nerves the performance comes to an abrupt end.

On the other hand, emotional states may produce reflex inhibition of salivary secretion, which we express by the saying that the tongue cleaves to the roof of the mouth, through fear for example. These and other considerations have led observers to search for a centre within the cerebral hemispheres, but though many attempts have been made to discover such a centre, up to the present none has been localised, the only result of cortical stimulation has been to show that electrical excitation of the facial area generally induces some salivary secretion.

Attempts have also been made to prove that the gastric glands are under the direct control of the nervous system, but the results of experiments are, so far, rather unsatisfactory; all that can be safely said is that they are caused to secrete reflexly, and that therefore some nervous mechanism is involved, but the exact channels through which the nerve impulses travel are at present not definitely ascertained.

All these experiments go to prove that the chief factors in the production of glandular secretion are the gland cells themselves and that before they can enter into activity they must be reflexly stimulated through the nervous system. It is therefore important to ascertain, if possible, what changes occur in the cells consequent upon their activity.

Heidenhain seems to have been the first to seriously investigate this question, and his results were published in 1877-78. He noticed that each gland cell exhibited two zones, the one next the gland lumen filled with granules refused to stain with carmine; the other containing the nucleus was devoid of granules and stained readily. He further observed that the relative size of the two zones varied from time to time, the granule zone increasing, and the stainable zone diminishing during rest, whilst the opposite obtained during secretion. He



considered the granules to be preformed secretion. He also dissected out the glands and found them heavier during rest than after secretion, and observed that a resting gland on chemical analysis yielded more solids than a gland that had been active for some time. He considered that the loss of weight and of solid constituents was due to the removal of the granules during secretion. He also observed that both the nucleus and the nucleolus increased in size during activity, and that the glands grew smaller and shorter as secretion advanced.

The presence of granules had been observed by Pflüger as early as 1871, and by v. Ebner in 1873, in the cells of the serous glands of the tongue that bear his name.

From 1877 to 1882 Nussbaum studied the cells in many glands, amongst others those of the pancreas, salivary, and oesophageal glands, and those of the stomach; in all of them he signalled the presence of granules which he considered products of secretory activity, acting as carriers of the ferment manufactured by the glands. This view was challenged by Flemming in 1882, who maintained that the so-called granules of other authors are nothing more than the optical sections of the cell network. Klein is also of the same opinion.

Altmann again maintains that the granules are only bioblasts transformed into products of secretion, having lost their affinity for acid fuchsin. He believes that the granules are excreted by the cells, and that new ones form at the expense of fuchsinophile bioblasts, which, according to his view, multiply by division.

In 1884-86 Langley published his classic researches on cellular secretion, returning to the first idea, and he maintains that the cell body is composed of a scaffold of living substance, of which the margin is surrounded by a continuous layer of modified protoplasm. In structure the protoplasm appears to be a network of fine filaments of about equal dimensions, in the meshes of which a hyaline substance is present and spherical granules. These granules represent the product destined to be

secreted, an augmentation in their number corresponds with a diminution of the inter fibrillar substance, and he concludes that the network secretes or produces the hyaline substance from which the granules are derived. The granules of gland cells would thus be secondary formations resulting from differentiation of the protoplasm.

He further points out that during the resting condition the cells are swollen, crowded with granules to such an extent that the nuclei are practically invisible in hardened preparations, and the cell outlines very indistinct. As secretion advances the granules are carried out of the cells in the watery fluid, first disappearing from the bases of the cells. In this way the appearance of two zones is produced, the one next the lumen containing all the granules, the other, devoid of granules, contains the nucleus, which can now be distinctly discerned. When exhausted the cells are very small and exhibit only a few granules along their free margin, the lumen has also become wide and stellate. In these shrunken cells the nuclei are spherical and larger than before secretion commenced, and he seems to believe that there is increase in the organic constituents of the nucleus.

He makes this further statement, that during secretion a growth of protoplasm actually takes place, by which he means that the protoplasm besides extracting fluids and salts from the lymph, draws into itself proteid material which it utilises for the production of new granules, so that within limits the production of granules keeps pace with their discharge. Ultimately, however, after prolonged secretion the cells fail to produce granules with sufficient rapidity to supply the demand, and consequently there comes a time when the ferments secreted diminish much in quantity and may even be almost absent. These or similar changes may be observed in both mucous and serous cells, and in those of the pancreas and stomach glands.

The lachrymal and parotid glands of a man who had been executed were studied by Nicolas in 1892, with the result that he concluded the protoplasm to be a fundamentally homogeneous structure, containing granules in tiny vacuoles filled with

fluid, and therefore that the granules are absolutely independent of the protoplasm. Contrary to Altmann's observations, Nicolas has always seen the granules stain readily with acid fuchsin. He further believes that the granules are dissolved in the vacuoles at the moment of glandular secretion, for it is extremely rare to find any traces of them in the fluid contained in the excretory canals.

In the same year Saint-Remy, following the researches of Dostorewsky, Lothringer, Bogowitsch, and Stieda, maintained that the fuchsinophile granules first appear in the protoplasm as minute dots, enlarge at the expense of the protoplasmic mass, exhibit less and less affinity for fuchsin, and finally disappear as products of secretion. He was however unable to come to any definite conclusion concerning their method of disappearance.

So many contrary statements concerning this important subject led me to commence the reinvestigation of it some five or six years ago. I selected the common crested newt as the most suitable animal for the purpose on account of the large size of its cells and the readiness with which it can be obtained in quantities. I performed a number of experiments by feeding newts of the same size with the same amount of worm and killing a specimen at the end of each hour for twenty-four consecutive hours. The stomachs of the newts were prepared by the most modern histological methods and subjected to critical examination under the microscope.

Without going into further details, I may state the conclusions to which I have been brought by this and other researches. As soon as the food is swallowed secretion commences in the oxyntic glands of the stomach, that is, in the glands that correspond in the newt to the cardiac glands of mammals, and sweeps along the whole organ, beginning at the œsophagus and passing off at the pyloric end, at such a rate that the cells near the pylorus attain their maximum activity some one and a half or two hours after those near the œsophagus. For any one cell, the wave reaches its maximum between the third and fourth hour or hour and a half, and is followed by a period of rest and

recuperation, which lasts for another four or five hours, after which, if food is still present in the stomach, the cell again enters upon a second secretory period that follows the same course as the first.

As will be seen from what has already been said, this is quite at variance with the statement of Langley, that the cells continue to secrete actively so long as any food is in the stomach, and that there is a formation of zymogen granules going on hand in hand with their discharge. Were it the case that the secretion of gastric juice goes on as long as food is present in the stomach, we should be driven to conclude that in the case of the rabbit, whose stomach is never empty in normal conditions, the gastric juice is secreted continuously. This is certainly not the case, as it is quite easy to obtain resting glands from the stomach of these animals, if killed at the proper time after an ordinary meal, and that without having recourse to starvation. Further, that periodicity exists in the case of the human stomach has been fully established by the experiments of Manille Ide and his pupils.

They fed a man at regular hours, say for the space of one week, with a given quantity of the same food, and withdrew a portion half an hour after each meal and showed that digestion was taking place. On the 8th day they gave the man his breakfast one hour earlier than usual, and found on testing the contents of his stomach half an hour afterwards that not a drop of gastric juice had been secreted; by further testing at short intervals they were able to show that the glands began to secrete at their usual time, that is to say, at the time the meal had been given the previous week.

I have only cited one of their numerous and varied experiments as an example of their method. We may therefore safely conclude that periodicity is a necessary phenomenon in cell secretion. The question then arises, why should the cells need rest? and what happens during the resting period? The answer to this question is a long one. The resting cell is full of granules, which disappear gradually by solution within the

cell to produce the ferments of the secretion, and after a few hours at most the cells have become shrunken and almost devoid of granules, which a little later are reproduced in abundance with almost startling suddenness. Where do they come from? The behaviour of the nucleus will perhaps afford a clue. The nuclei during the period of fasting and immediately before the ingestion of food contain abundance of chromatin arranged in the form of an irregular network, within which, again, one or more small red-staining nucleoli are visible. The nuclear juice contains very little proteid material, as may be shown by precipitation with mercuric chloride, which throws the proteid down in the form of minute granules, called lanthanin M. Heidenhain, which stain only of the palest blue colour.

On the commencement of secretion the nuclei increase slightly in size, but soon become smaller and smaller, and finally show great wrinkling and puckering of the nuclear wall, due to the diminution of their contents. During this time the chromatin spreads itself out under the nuclear envelope and can be seen to diminish in quantity, and assume a water-logged appearance, staining the while less and less vividly with blue until about the third hour it ceases to react to the blue dye, preferring the red acid eosine. This is very remarkable, as it denotes that in addition to becoming diminished in quantity, the chemical nature of the chromatin has been changing. By this time the trace of lanthanin has almost disappeared from the nucleus, the nucleoli have been steadily increasing in size, till in some cases they became enormous and are shot out of the nucleus into the protoplasm, where they gradually dissolve and disappear, new ones being formed in the nucleus to take their place. The nuclei are now quite exhausted.

The reaction of the cell protoplasm next undergoes a change, showing that it is taking up albuminous material from the lymph, and at once zymogen granules begin to reappear in it in great numbers; but they are not discharged, they remain stored in the protoplasm, despite the fact that the food is still exerting a powerful reflex stimulation to secrete upon the glands. The



products of secretion are there, but they fail to be discharged—Why?

Let us again turn to the nucleus. Almost as soon as the change of reaction is well established in the protoplasm the nucleus is seen to be profiting by the incoming lymph, and the nuclear juice when precipitated is found so rich in lanthanin that its internal structure is completely clouded by the lanthanin granules, which now stain of a deep vivid blue colour. This shows that nuclear repair has commenced, and the nucleus soon swells up to a size far exceeding its original dimensions. Soon however the lanthanin grows less abundant and begins to lose its vivid blue colour, passing to lilac, and finally, as repair of the nucleus nears completion, it assumes its original faint blue tint. Meanwhile the nucleoli have again been growing in size, and may in some cases be extruded, and the chromatin reappears, gradually increasing in amount, withdrawing from the cell-wall and resuming its ultramarine blue tint.

These phenomena puzzled me for a long time, for I was at a loss to account for the great nuclear exhaustion observed, as it seemed to me the effort was far greater than could be possibly accounted for by the mere passage into the liquid state of a substance so readily soluble in dilute acids as zymogen. Especially when one considers that in mammals the acid is produced in cells especially set apart for the purpose.

I happened to discuss the matter with Professor Maccallum, of Toronto, who had not then published his researches in full, and I at once saw that the key to the difficulty had been found. Maccallum working with the pancreas, by novel chemical methods, was able to show that the nucleus plays an important part in the production of glandular ferments, and that there existed in the protoplasm at certain stages a substance rich in phosphorus and iron, antecedent to the zymogen granules, to which he gave the name of "Prozymogen." This substance he believes to be derived directly from the chromatin of the nucleus, because it contained both phosphorus and iron. In fact it is the presence of phosphorus and especially of the iron in it, that

permits of its being revealed by chemical means when suitably unmasked as directed by him. Maccallum was however unable to go further than this, in that he could not demonstrate any visible change in the amount of chromatin present in the nucleus of the active cell, though he believed that such must occur.

As soon as the cell begins to part with its stored up zymogen, the nucleus commences to produce at the expense of its chromatin, a new antecedent substance, namely, prozymogen. The production of this substance is facilitated by the movement towards and the spreading out of the chromatin immediately beneath the nuclear envelope. This prozymogen must pass into the cytoplasm in a liquid form as there is no evidence of it within the nucleus, and when poured out into the protoplasm it remains in the neighbourhood of the nucleus without being at once converted into zymogen, but remains as a compound of considerable stability increasing in amount until the full complement has been produced. This stage is marked by the change in the reaction of the remaining chromatin and no more prozymogen can be manufactured until a new supply of chromatin has been reproduced in the nucleus from some constituent of the cytoplasm.

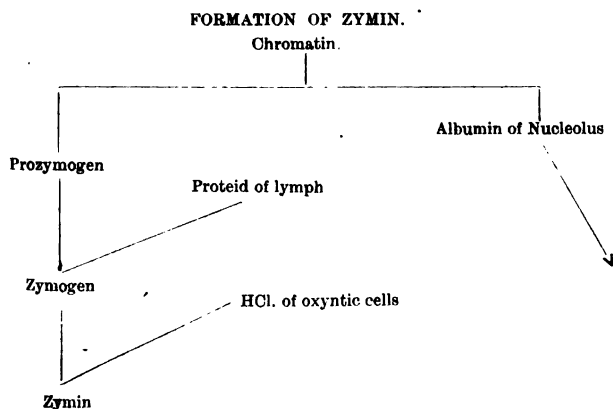
As soon as the zymogen granules have become exhausted, the cytoplasm begins to take up material from the lymph, probably of an albuminous nature, as its appearance in the cell is marked by a change of reaction. This ingestion from the lymph of proteid material permits the rapid conversion of the prozymogen into zymogen, which is retained in the cell and not at once discharged, but retained until such a time as the nuclear chromatin shall have been completely restored.

The renewal of chromatin is brought about by the entrance into the nuclear juice of an easily coagulable substance (probably a proteid material among other things) which is the meaning of the great increase in the number of the lanthanin granules at this time.

Chemically, chromatin contains nucleic acid and an albuminous substance. It is very stable and acts as an acid to

bodies less acid than itself, therefore it stains with methyl blue. In order that this stable body may pass into the cytoplasm, it is necessary that it should be rendered soluble; in this process some of the albumin is removed and goes to form the nucleolus. This albumin acts as a base in presence of bodies more acid than itself, and therefore exhibits marked affinity for eosine. Being now useless in the nucleus it is extruded into the protoplasm, there to be disposed of. The more acid part of the chromatin passes into the cytoplasm, where it remains in an invisible state unless the phosphorus and iron it contains are unmasked and revealed by dyes.

When the cell begins to take up material from the lymph, the prozymogen quickly links on some albumin to become zymogen in the form of granules, nucleo-albuminous in nature, which is probably a still less stable compound than the prozymogen; it now reacts as a feeble base to eosine, and hence is stained red with that dye. It is also readily soluble when brought into contact with weak acids, either in the cytoplasm or elsewhere. In other words, both chromatin and zymogen have the same nuclein radicle, their difference in staining property and solubility depending on the amount of albumin linked on to it.



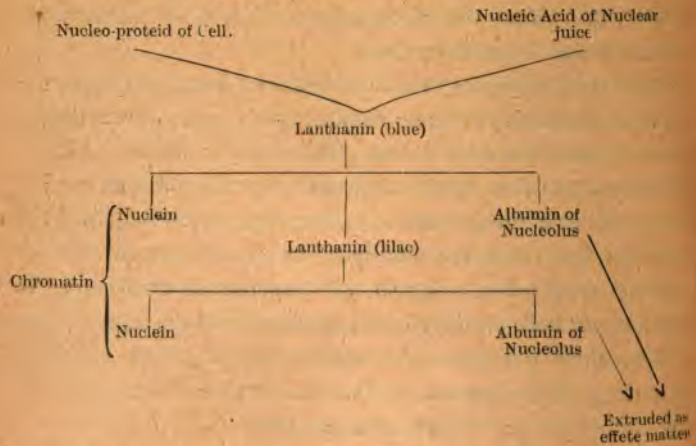
The repair of the nucleus can only be brought about by the passage into it of substances from the cytoplasm, which probably unite with nucleic acid in the nuclear juice to form ?



material analogous to chromatin, *i.e.*, the blue staining lanthanin. This material seems gradually to give up its nucleic acid to increase the chromatin, leaving a less acid material in the juice, which stains lilac. Finally also this material seems to be removed, possibly passing to increase the size of the nucleolus, and may or may not be in sufficient quantity to induce some nucleolar expulsion during repair.

## SYNTHESIS OF CHROMATIN.

Proteid of Lymph becomes in cell a nucleo-proteid.



I think, therefore, that one must look to the nuclear juice to find the earliest indication of the synthesis by which chromatin is built up from simpler compounds. This is a beautiful example of nucleo-cytoplasmic interchange, and a further proof of the nuclear origin of cell ferments. I believe that this necessity for repair of the chromatin sufficiently accounts for the phenomenon of the double secretory wave, the cell, though full of zymogen granules, not being in a fit state to secrete again until the nucleus has been completely restored, but when once this point is reached, there being no longer any further need of rest, the cell again starts secreting zymogen and the nucleus pro-zymogen should any call be made upon its energies. We must therefore believe that to the usual functions ascribed to the chromatin of the nucleus yet another important one must be

added in the case of specialised cells at least, namely, that of producing at its own expense materials for the well being of the body as a whole.

Digestive ferments are not the only things produced in this way, for eleidin, which is the antecedent of keratin in the skin, hair, nails, and horn, results from a modification of chromatin, as do also probably the granules of granular leucocytes and the spindles of Nissl in nerve cells. This secretory function does not appear to interfere in any way with the nutritive, reproductive, or other vital manifestations of chromatin, for it is quite common to find mitotic figures in all stages in the oxyntic cells of the stomach during secretion; and should a cell be called upon to secrete during nuclear division it does so exactly as if no mitosis was going on, and the secretion proceeds along with the division both occurring at the same time, the chromatin of the mitotic figure showing exactly the same changes in appearances, quantity, and staining reaction exhibited by the karyosomes of the cells that are not dividing, the only apparent difference being that owing to the disappearance of the nuclear envelope no nucleoli are formed, the split off albuminous material being disposed of directly by the cytoplasm. This seems to suggest that only a part of the chromatin is concerned with the transmission of hereditary characters.

The behaviour of the nucleoli during secretion is also worthy of note: during the early stages they increase in size, often attain considerable dimensions only to be cast out of the nucleus and melt away in the protoplasm, new ones being quickly re-formed to take the place of those extruded, and these again may increase in size during the period of repair and suffer a like fate. Many are the functions that have been ascribed to the nucleolus.

Häcker believed it to be nutritive for itself, for the nucleus, and for the protoplasm. Balbiani looked upon it as a sort of heart. Flemming, Malaquin, and others believed that it manufactured chromatin; Sabotta, Labbé, Mingazzini considered it to be a store house for chromatin manufactured elsewhere. Pizon, from his researches on ascidia, believes that it casts off

effete material. From my own observation in the stomach of mammalian ovaries during activity, I have been forced to alter the view of Pizon that the nucleolus is in part if not entirely composed of effete material which is tolerated in the nucleus at a time, but expelled either entire or after fragmentation as its bulk renders it detrimental to the well-being of that body.

In the foregoing I have attempted to give a summary of our knowledge of the phenomena of cell secretion. With the facts at our disposal is it permissible to generalise? When we attempt to do so we are at once met by many difficulties. To go no further than the salivary glands, we know that in certain animals the secretion of saliva is continuous, though not always as abundant as during mastication. I venture to predict that in this case, investigation will show that only some cells of the gland are in activity at a given time and that the great mass of cells are in the resting condition during the intervals, and therefore ready to pour out an abundant secretion whenever they are prompted to do so by the mastication of food. Further, I believe that it will be shown that these cells have also their period, and in the case of the horse and ox may be a long one, and during the interval of fasting, successive groups of cells take up the secretory function, thus permitting those already exhausted to recuperate, the more so as in the case of the pancreas during hibernation groups of cells are plainly seen in an active condition, while other groups near them are as plainly in a resting state.

Heidenhain has shown that by stimulating the sympathetic fibres to the submaxillary gland of a dog for fifteen minutes of every half hour he could produce secretion for hours on from which we must conclude that an interval of fifteen minutes was sufficient in this case for the glands to completely recover from the effects of stimulation.

This is quite an analogous case to the experiment of Magnus on the fatigue of muscles. He showed that if an interval of a few seconds is allowed between two successive efforts made by the finger to lift a weight, the process of lifting can be continued.



24 hours or indefinitely without the supervision of fatigue, and he explains the continued beating of the heart on the same theory, namely, that the interval between two successive beats is sufficient for the complete recovery of the heart muscle.

The mammary gland offers another very considerable difficulty. How is it possible to account for the production of the vast amount of nucleo-albumin (caseinogen) present in milk? Can it be produced from the chromatin of the nuclei of mammary gland cells? It would be hazardous to maintain such a theory at the present time, for our knowledge of the way in which milk is produced is of the scantiest.

When we turn to such glands as the liver and kidneys, whose secretion is always constant, the difficulties become much greater. Possibly in the case of the kidney, pressure and osmosis may be able to account for the secretion; still under certain circumstances the kidney cells exhibit appearances suggestive of fatigue, and though the subject has been paid some attention to in Germany we are far from knowing most of the facts of the case. With regard to the liver, still less is known.

For the present, therefore it is safer to attempt no general statement, but to urge that more observations should be made on a great number of different glands and in different animals. These and similar questions concerning the physiology of the ultimate units of the body offer a tempting field for original research, and let me take this opportunity of stating that I shall be most happy to give what facilities and help are within my power to all those who desire to prosecute research within the Physiological Laboratory of the Mason University College.

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## THE TREATMENT OF STERILITY.

BY DR. FREDERICK EDGE,

IN opening up a wide question like this it is necessary to have some division of the subject, and since all rational treatment is based on knowledge of the causes, it seems to me that the divisions of treatment may follow those of the causation with great practical advantage. As a general rule, when we are speaking of sterility, we are dealing with the incapacity of a certain marriage to yield children, but absolute sterility or true sterility means the absence of fertilisation of the ovum and its implantation in the uterus. But there are many cases where fertilisation and implantation of the ovum take place, but abortion early or late occurs, and no living or viable child results from the marriage. This is not true sterility but failure of growth after fertilisation and is called false sterility. Abortion may take place at so early a period that we cannot diagnose it, but for practical purposes we must look upon cessation of menstruation as the criterion between true and false sterility.

If true sterility be taken first it is evident that it is due (1) to the husband—(a) no spermatozoa; (b) defective spermatozoa; (c) spermatozoa not placed in position in female (impotence, ignorance, prevention); (d) incompatibility (history of children by previous wife and other women).

(2) To the wife—(a) no ova; (b) defective ova; (c) ovum not carried to locality for fertilisation; (d) ovum not preserved for growth after fertilisation; (e) incompatibility (history of children by previous husband or other men).

Primary and secondary sterility are very different, for in the primary no pregnancy has taken place, whereas in the secondary form pregnancy has occurred one or more times, but owing to one or both parties having become diseased the marriage becomes sterile.

The wife is generally blamed for sterility, and the husband but seldom suspected, unless there is clear evidence of impotence or abnormality of the genitals. But investigations have shown

that in about 30 per cent. of the cases of sterility the husband has no spermatozoa (azoospermia), and in 25 per cent. more the spermatozoa are very scarce (oligospermia). This shows the necessity of always examining the husband. The examination begins by examination of the husband as to previous illnesses, gonorrhoea, syphilis, traumatism, acute fevers. Has he sexual desire, erections of penis, seminal emissions, nocturnal emissions? The external genitals. Penis well formed? No urethral failure, fistulae, congenital or acquired? Stricture? Testicles in scrotum? Size? Varicocele? Hernia? Hydrocele? But given proof of capacity for sexual intercourse (and this should be carefully ascertained from both the husband and wife by detailed questions, and no mere offhand assertion accepted) the examination is confined to making out living spermatozoa. The usual method for obtaining the semen of the husband is to prepare the wife by douching the vagina with weak alkaline or boracic solution (3j to Oj) night and morning for three days before connection takes place. The semen is then taken out of the vaginal fornices after coitus and examined microscopically.

The treatment of azoospermia and oligospermia consists in removing all local or systemic causes of disease and bringing the patient into the highest state of general health. Tonics, alteratives, and stimulants will play a leading part, and empirically a long course of alterative (mercurial) treatment ought never to be omitted, and the husband should be a total abstainer from alcohol and tobacco, but should take as much nutritious food as possible.

The possibility of ignorant and imperfect coitus must always be borne in mind, and only recently a medical friend in Wolverhampton told me of a case where the husband has lived two years with his wife and is unaware that his wife has practically no vagina. Also people who are using means to prevent pregnancy are sometimes forced to consult a physician by their friends, and the physician may suffer in his reputation for shrewdness unless he diagnoses the untruthful patient.

As regards the woman one or two points regarding impregnation must be noted. The spermatozoa soon die in the acid



vaginal secretion, but live from six to eight days in the uterus and Fallopian tubes. The ovum and spermatozoon meet usually in the tube at the abdominal end. There is some suction from the vagina and the external os enlarges at coitus, but the spermatozoa depend chiefly on their own movements to reach the uterine cavity and the tubes. A fertilised ovum must be present in the tube within six to eight days after coitus. The ovum ripens in a Graafian follicle of the ovary. Fluid collects in the follicle, and this approaches the surface of the ovary and its wall becomes thin. In the premenstrual period or that of coitus the follicle bursts. The ovum and follicular fluid run into the peritoneal cavity near the infundibulum of the tube, and are swept into this by the current produced by the ciliated cells of the tube, or, as some think, arising independently of the ciliary action. (If the ovum is in its tube it may possibly get over to the other tube, but usually perishes in the peritoneal cavity.) It meets the spermatozoa in the tube, is fertilised and drifts into the uterus, where it becomes attached by the villi of its ectoderm to the inner membrane which grows around it forming the decidua. Although conception may occur without any consciousness on the woman's part, still the normal coitus and orgasm normally facilitate conception.

After a general examination of the wife and a study of her previous history the external genitals may be examined. The penis or at least the semen must have admission. Agglutination or occlusion of the vulva by malformations or ulcerative processes, by large new growths such as lipoma and elephantiasis prevent the approach of the penis as do abnormal size of the labia minora and clitoris.

Abnormal retroposition of the vulva is said to prevent coitus. Tender points like urethral caruncles may prevent coitus. Vulvitis and kraurosis vulvæ also act in this way. Signs of hermaphroditism must be looked for. The vaginal entrance and the hymen may obstruct the entrance of the penis unless the hymen is imperforate (atresia hymenalis) concealing

may occur. Vaginismus or spasmodic contraction of the constrictor cunni when an attempt to introduce anything through the tender orifice of the vagina is made, occurs frequently and may be a very practical cause of sterility. The remnant of the hymen should be removed and the vaginal introitus well dilated under an anæsthetic. Often an acid strong urine is a strong factor in the case, and the coexisting hyperacidity of the vaginal mucus accounts for the death of spermatozoa which may be working their way into the vagina from the vulva.

There must be a vagina and it must be patent and in double vagina it must lead to the side of the uterus capable of conception. Cicatricial stenosis of the vagina, prominent cysts in its walls, fleshy bands shutting off the cervix, cancer and sarcoma and even tumours in the pouch of Douglas all act against conception.

Vaginal descent and prolapse, cystocele and rectocele seldom act in this way because they are remedied during coitus. A very short wide slack vagina hinders conception by permitting escape of the semen, so does a torn perinæum and the absence of the orgasm during which the levator ani and constrictor cunni muscles contract and keep the semen in. Vaginitis prevents conception since the seed is washed out by secretion which is acid and paralyses the spermatozoa. Vesicovaginal fistula often causes sterility because the urine kills the seed and also because the patient does not usually menstruate and ovulate. The vaginal portion of the cervix should be at right angles to the vaginal axis, in the middle line with the os looking back and down, that is, dipping in the pool of semen in the posterior fornix.

All displacements hinder conception, but they do not absolutely prevent it. They should be rectified. Changes in shape of the portio vaginalis may cause sterility. Elongation of the cervix, great enlargement of either lip with displacement of the os, follicular hypertrophy, and long conical cervix may hinder conception because the semen is deposited in the vaginal vaults. Shortening and absence of the cervix are often seen in sterile



women, but are the result of uterine atrophy, which is the cause of the sterility. Stenosis of the external os was very important formerly, before the bimanual examination came in. A stenosis naturally stops conception; but the value of stenosis in causing sterility is difficult to estimate since spermatozoa will enter the os, though the finest sound cannot pass. Still, stenosis generally exists with a pointed long cervix and atrophic uterus, and the cervical and uterine secretion is thickened and more homogeneous. When these conditions are absent stenosis may be blamed. The best criterion is the treatment by dilatation. Generally stenosis is not of much account, and examination of parts higher up should not be overlooked. Stenosis after ulceration or plastic operations is not an absolute check, neither is that from cancer or myoma. It is not difficult to detect stenosis with a speculum and a sound. Most of the causes of stenosis mentioned so far have corresponding means of treatment which are self-evident, such as removing tumours in the vaginal walls, curing vaginal catarrh and fistulæ, but as regards the os there are many plastic operations devised for various shapes and states of it. If too long it is amputated; follicles are punctured. In the common form of conical cervix and pin-point os the operation of splitting the posterior lip up to and including the internal os with suture of the raw surfaces to prevent the union is to be recommended.

The cervix stops conception if closed (atresia). This occurs in hæmatometra. True stenosis may be present owing to the thickening of mucous membrane closing the lumen, and yet a sound may not detect the stenosis because it passes through them. Flexion and retroflexion kink the cervical canal, but practically stenosis may be declared to exist when a sound 2 mm diameter does not pass the cervical canal after the cervix has been straightened with volsella. The internal os is often affected, but malignant diseases cause stenosis of the canal. Here again it is the catarrh and follicles with retention of secretion which are more to blame than the stenosis. When stenosis is present it is well to blame it and treat it, since conception often occurs after a single simple dilatation.

Tumours act mechanically, and by deranging the secretions or giving off decomposed matters which like the secretion in cervical catarrh either obstruct the lumen or kill the spermatozoa. Myomata and mucous polypi should be looked for and removed. The body of the uterus has a twofold relation to the occurrence of conception, for it acts as a highway and shelter for both ovum and spermatozoon, and after fertilisation it is the bed in which the ovum is preserved by becoming imbedded.

All uterine malformations may cause sterility. The rudimentary uterus without cavity and the infantile uterus with small body and long cervix are instances. Sterility occurs in high degrees of hypoplasia, but here the ovaries are also atrophied, and this is indicated by scanty or absent menstruation. Atrophy as a result of local or general diseases causes sterility, and this may continue until menstruation occurs; but conception sometimes takes place before menstruation, as in the amenorrhœa of lactation or after severe diseases. Concentric atrophy is more certain to cause sterility than eccentric atrophy. Double malformations do not cause sterility so long as one half works normally.

Atresia and stenosis arising from severe puerperal diseases after curetting and caustics are mechanical obstructions. They are detected with sound or by the presence of hæmatometra. Uncomplicated displacements prevent conception by dislocating the portio vaginalis, and by kinking the cervical canal; but if uncomplicated by endometritis, chronic pelveo-peritonitis, or disease of the appendages, conception generally takes place, owing to the activity of the spermatozoa, and some rectification of the faulty position may occur during coitus, as it does in descent and prolapse of the uterus. Flexions, unless it be retroflexion, are of but little importance in multiparæ, but the stenosis they cause in nulliparæ is a hindrance to conception. Ante-flexion is specially fatal, but this is because it is often found in defective development of the uterus, and as a result of posterior parametritis. Simple ante-flexion acts by producing stenosis,



just as retroflexion does in multiparæ, and dilatation of the flexed uterus acts as effectively as replacement does with flexion.

There is much controversy as to the action of myoma regards sterility. It acts by obstruction and stenosis of the uterine cavity, and by causing catarrh, increased secretion, and hæmorrhages, but it is well known that intramural and subserous myomata do not prevent conception, and submucous myomata only does so sometimes.

Carcinoma and sarcoma hinder conception, and of course their treatment removes all possibility of conception.

Endometritis and its discharges are the great cause of sterility. These obstruct the entrance of the spermatozoa and sweep out the ovum. The uterine cavity is enlarged, the mucous membrane is wasted, and does not hold the ovum or form a decidua. It leads to recurrent abortion, and by preventing conception, and by interrupting it should an event happen, endometritis is more to blame than anything else for unfruitful marriages. Of the varieties of endometritis the most injurious to conception are the membranous and menorrhœic forms, while the forms with hypertrophy of the mucous membrane and free bleeding are least so.

The Fallopian tubes carry the ovum from the peritoneal cavity to the uterus and admit the spermatozoa. Every condition which closes the tube renders conception impossible. Retention tumours, like hydro-hæmato and pyosalpinx are proofs of this closure, but it is probably present in most cases of salpingitis. If there is inflammation inside the tube this produces a secretion, which is injurious to the ovum or causes the current to set back into the peritoneal cavity, or is so thick that the ovum cannot get through it. If any thickening of the tubes is discovered it may be said to decide the cause of sterility.

The treatment of these conditions is naturally to remove the obstruction, and alteratives with hot douches, massage, and aperient form the basis of it. As regards the surgical method

shall speak later on. The ovaries grow and extrude the ova, and we can only judge of this function by the size of the ovaries and by the cessation of menstruation. If menstruation continues ovulation is generally present, but ovulation may occur without menstruation owing to uterine disorder. The subjective sensations of the periods (molimina) ought in this case to be present. If there is amenorrhœa and the ovaries are small, sterility is nearly always the result. This is seen normally after the climacteric. Wasting diseases cause diminution of the ovaries. Acute and chronic oophorites hinder the growth of the ova, and if follicles result sterility must follow, because this prevents escape of the ova. Fibrosis of the ovarian stroma, adhesions and sheathings of the ovaries in peritoneum or plastic material, as in peritonitis, cause sterility. Double malignant ovarian tumours cause sterility because no healthy ovarian tissue is left, but ordinary cystomata and tumours need not produce sterility, and when sterility co-exists it is due to uterine and tubal displacements and troubles caused by the tumour.

The peritoneum is often to blame by shutting off the ovaries, large exudations act by displacement and involving other organs, the ovaries may be fixed in the pouch of Douglas and with tender bands may render coitus impossible. Adhesive peritonitis affects the ovaries and tubes by shutting in the ovaries and kinking and closing the tubes and by destroying the relations between the ovaries and the infundibulum. Parametritic processes, unless very big or wasting to the system, or followed by atrophy, need not cause sterility unless by displacement of the uterus and tubes.

Dyspareunia and absence of orgasm may be followed by conception, and probably these conditions only hinder conception by allowing the semen to escape, or preventing its deposition in or near the os uteri.

Wasting diseases, acute fevers, anæmia, chlorosis, nephritis, and obesity prevent conception in various ways, and the treatment is that of removing the cause.

It may be said that primary sterility is due to antelexion,



stenosis and congenital defects, while secondary sterility is due to trauma and disease and the elucidation of this will assist the treatment materially.

Now it has not been my intention to give the treatment of all the causes of sterility nor to speak any more of the male sterility. The cases in which a distinct cause is found give their own indications for treatment, or leaving affairs alone, yet in practice we find most cases are very compound, and if the points are followed up seriatim either the patient gets weary of treatment or cannot afford it. We must mass our batteries and attack the disease with every means at once. When nothing definite can be made out by ordinary means anæsthesia must be insisted upon to aid in the examination, and after examination per vaginam a careful rectal examination should be undertaken.

But the surgeon requires not only anæsthesia, he wants exploratory incisions to thoroughly investigate every organ involved, and this progressive systematic operative procedure may be carried out as described below.

Take a case where there is a little spasm of sphincter muscles yet not true vaginismus; a pointed cervix with small os, but no real stenosis; some dysmenorrhœa, uterine catarrh, tender ovaries, and a band of adhesion in the pouch of Douglas; perhaps the uterus is retroverted or anteverted and retroplaced; anyhow there are twenty conditions which may be causing the sterility, but not one which can be designated as the head of the offence. This may be primary sterility.

In another case there may have been abortion or even a child some years before. There are uterine discharge, follicular cervix, largish uterus, displaced to one side or other, generally backward or flexed; the tubes can be felt, and there is a feeling as if the contents of the pouch of Douglas do not move freely over one another. Here is a case of secondary sterility.

In both cases there are many causes at work, and unless some composite method be employed it is not to be expected that all

or rather the necessary amount of hindrances will be removed to enable conception to take place.

My general procedure is as follows :—The patient is anæsthetised and placed on the operation table in the lithotomy position. The vulva and vagina are thoroughly scrubbed and cleaned with 1 in 100 lysol solution, methylated spirit, and 1 in 1000 corrosive sublimate solution. The bladder is emptied with a sterilised glass catheter.

The vulva is now examined carefully and such impediments to coitus as caruncles, lipomata, are removed, abnormal length of labia and clitoris may be treated by plastic operation. (Ulcers and vulval catarrh can be cured by simple douches and ointments or other remedies.) Agglutinations are separated and if there is occlusion an entrance is made, the whole septum is taken away and the vulval and vaginal mucous membranes sutured. Remnants of the hymen causing vaginismus are similarly dissected off, the whole hymeneal insertion being taken away. The vaginal introitus if found tight and narrow is forcibly dilated with the fingers. (It is afterwards dilated every week for three months by passing a Sims' speculum and drawing this back. Or the patient may have a set of graduated vaginal dilators. One of the chief conditions upon which vaginismus rests is a hyperacidity of the urine and copious alkaline drinks such as barley water with tartrate of potash will help the local treatment).

The vagina is now examined and any cysts or tumours in its walls attacked. But in every case alkaline douches must be enjoined, especially at night before coitus. If the perinæum is very torn or deficient it must be repaired. The cervix and the os uteri are examined and any uterine displacement corrected. If the cervix be elongated it is necessary to amputate it, and if follicular hypertrophy be present, keel-shaped excision may be done. Hypertrophy of either lip is treated by amputation. If the patient is a nullipara the os may be stenosed, but whether stenosed or not the method advised is to dilate the cervix, to amputate if necessary, and to perform posterior discision. This



throws open the cervix up to the internal os and removes any chance of the spermatozoa being hindered from entering the uterus. Should absolute atresia be met with there will naturally be hæmatometra and the opening must be made under the strictest antiseptic precautions.

The *dilatation of the cervix* enables any tumours of the uterus or diseased states of the endometrium to be made out. Where no definite lesion is detected curetting is carried out as an aid in diagnosis and a means of treatment. In large uteri and hypertrophy of the endometrium a caustic may be applied to the uterus after curetting, but speaking generally, it is better not to use caustics as atrophy of the mucous membrane and stenosis may follow upon it.

After curetting it is often necessary to wash out the uterus once a week with boracic acid lotion, or some mild antiseptic, to ensure complete rehabilitation of the mucous membrane. In some cases the curetting may have to be repeated several times. Having dilated and divided the cervix and curetted the endometrium, the next step in these cases of indefinite and obscure causation of sterility is to deal with the Fallopian tubes and ovaries. For this purpose anterior vaginal cœliotomy is performed and the fundus of the uterus with the tubes and ovaries drawn into the field of view. To do this it may be necessary to separate adhesions and divide bands and membranes which may have been the cause of sterility by producing kinks and obstruction of the tubes, or by causing displacement of the infundibulum or shutting off the ovaries. The tubes are examined carefully, constricting bands are divided, kinks straightened out, the agglutinated fimbriæ opened up, and artificial stomata made if the infundibulum is absolutely grown up. Hydrosalpinx, hæmatosalpinx, and pyosalpinx are usually perceived by examination and opened and drained through the posterior vaginal fornix.

The ovaries are freed from adhesions and cysts, are punctured or portions of diseased ovarian tissue are excised. Whenever there is oozing or there has been much handling of the appen-

dages it is better to open the posterior fornix after closing the anterior wound and to drain through this.

These procedures may not be followed by quick results, but they facilitate absorption of exudations and inflammatory fibrous tissue, and tend to aid the genital organs to return to a healthy condition, and conception may be the consequence even if years afterwards.

The main points in the procedure are:—

- (1) Removal of tender remnants of the hymen.
- (2) Dilatation of the vaginal entrance.
- (3) Trimming of the cervix, dilatation and discision of the cervix.
- (4) Curetting and subsequent topical treatment of the endometrium.
- (5) Anterior vaginal cœliotomy with:—(a) Separation of bands and adhesions; (b) Freeing of the tubes and establishment of abdominal stomata; (c) freeing of the ovaries, (igni) puncture of cysts, resection of ovaries.
- (6) Posterior vaginal cœliotomy for (a) drainage of peritoneum; (b) evacuation and drainage of hydro, hæmato, and pyosalpinx.

This procedure is not difficult in execution, and takes the same time as a vaginal cœliotomy for the removal of tumours in the pelvis. The curetting of the uterus is a necessity, as otherwise in the squeezing and compression the uterus undergoes during the manipulations the field of operation is apt to be fouled, and peritonitis to ensue.

The routine opening of the pouch of Douglas after the operation has been performed by the anterior vaginal route is advised.

Dührssen says it leads to very painful adhesions, but this has not been our experience after draining with a piece of iodoform gauze through a small opening. The peritoneum in the anterior incision should be carefully closed, and if any fixation sutures are passed they must not go higher than the lower anterior face



of the body of the uterus. If the peritoneum be then carefully sutured, we obtain a serous adhesion which will hold the uterus forward, but will stretch sufficiently during pregnancy and labour to prevent any of the troubles which have been met with after vaginal fixation by the firm fibrous fixation of the fundus of the uterus to the vaginal cellular tissues.

When performed aseptically without fixation of the uterus the convalescence is rapid, and in nine days a patient may quit her bed. There is no possibility of hernia.

Supposing that no good results as regards the cure of sterility are obtained after this method, it is nearly always followed by relief of dysmenorrhœa to a greater or less extent, and in some of my cases where vaginal fixation was not necessary it is my opinion after examination that very minute inspection would be necessary to detect the fact of an operation having been performed unless discision of the cervix has been done.

*Nil nocere* is the surgeon's motto, and I beg to affirm that this complex procedure does not transgress the spirit of the motto.

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## MEDICAL ABSTRACTS.

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### INFECTIVE ENDOCARDITIS.

BY JAS. W. RUSSELL, M.A., M.D., M.R.C.P.

*An Analysis of Twenty-five Cases of Malignant Endocarditis.* By T. N. Kelynack, M.D. (Vict.), M.R.C.P. (Lond.). (*Medical Chronicle*, April, 1896).

*A further Series of Twenty Cases of Malignant Endocarditis.* By T. N. Kelynack, M.D. (Vict.), M.R.C.P. (*Medical Chronicle*, August, 1897.)

*Additional Cases of Malignant Endocarditis.* By T. N. Kelynack, M.D. (Vict.), M.R.C.P. (*Medical Chronicle*, August, 1899.)

*A Discussion upon Infective Endocarditis.* Annual Meeting of

the British Medical Association, August 2nd, 1899. (*Lancet*, August 12th, 1899.)

*The Goulstonian Lectures on Infective Endocarditis.* By William Osler, M.D., LL.D. (Edin.), F.R.S., F.R.C.P. (*British Medical Journal*, Vol. x., 1885.)

The fatal cases of Infective Endocarditis collected by Dr. T. N. Kelynack and published in the pages of the *Medical Chronicle*, now amount to 65 in number. His analysis is a minute one, and the results are worth bringing together and comparing with those recorded by other writers. The following are some of the more important points:—

The liability of the male sex to be affected with malignant endocarditis compared with that of women is about as three to one (49 to 16) in Dr. Kelynack's cases, and almost the same (54 to 16) in a series of cases collected by Mr. Alexander Foulerton from the records of St. Bartholomew's and the Middlesex Hospitals, and quoted at the Portsmouth meeting of the British Medical Association. In 160 cases, however, collected by Professor Osler from various sources, there were no less than 64 women to 99 men. Adding all these cases together, men stand to women in the proportion of a little more than two to one (202 to 93). These figures show a preponderance in the male sex which is not observed in cases of so-called "simple" or "chronic" endocarditis. Thus, Mr. Foulerton found that a series of 504 such cases gave practically equal numbers for the two sexes, namely, 260 men to 244 women.

Not many cases were met with under 10 or over 50 years of age, 3 and 6 being the respective numbers in Dr. Kelynack's cases. The average age of the men was 33·6, that of the women, 29·1. Professor Osler points out that the cases occurring in connection with rheumatism give an average age which is lower than that obtained in non-rheumatic cases. Thus, out of 51 cases of infective endocarditis following rheumatism, 36 of the patients were under 30 years of age.

A definite history of rheumatism was only obtained in Dr. Kelynack's cases in 33·8 per cent., in Professors Osler's cases

in 55 per cent. Dr. Kelymack, however, believes that the figures greatly underestimate the case. In Professor Osler's series, symptoms of severe cardiac disease appeared in the course of the rheumatic attack in 24; in the remaining 39 cases the history was of a past attack. According to Osler, the other well-marked association is with pneumonia, in the course of which any endocarditis which arises—a somewhat rare phenomenon—is not unlikely to be of a malignant nature. Thus, in 54 out of his 260 cases, the endocarditis was associated with pneumonia. Again, in a series of autopsies on fatal cases of pneumonia made in Montreal, endocarditis was discovered in 16, 11 of which were malignant in nature. Other associated conditions met with in Dr. Kelymack's cases show a variety so great that no abstract of them can be attempted.

Much interest attaches to the cases in which previous cardiac disease was demonstrated. These in the Manchester case amounted to 50 in all, though in only 12 of the remainder could it be said that the infective endocarditis was probably a primary affection. In Professor Osler's cases 45 were thought to be primary. The records from which his cases were taken were not sufficiently complete to enable him to state the proportion in which chronic valvulitis was present, but he quotes a series of 69 cases published by Dr. Goodhart (*Pathological Society's Transactions*, Vol. xxxiii.) in which 61 showed sclerotic changes of the valves. Dr. Washbourn, in opening the Portsmouth discussion, pointed out that in healthy valves the absence of blood vessels precluded the conveyance of bacteria to them through those channels, whilst in valves in which old mischief had occurred vessels were present, and were sometimes found plugged with bacteria in cases in which an infective process had supervened.

Adding the two sets of cases together, the valves affected were as follows:—Mitral alone, 94; Aortic alone, 71; Aortic and Mitral, 60; Pulmonary, 16; Tricuspid, 22. One case occurred of congenital malformation. The right side of the heart was alone affected in 10 cases. In one case the vegetations surrounded, and in another extended into a coronary artery.



Returning to Dr. Kelynack's cases, the duration varied from a few weeks to some months. In one, however, the illness only lasted a few days, and in another the patient was in good health till the day before his death.

Infarction, old or recent, took place in 34 cases. The lung was affected in 7, the kidney in 11, the spleen in 23, and the right cerebral artery in 1. Splenic enlargement occurred in 53 of the 65 cases.

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## REPORTS OF SOCIETIES.

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### BRITISH MEDICAL ASSOCIATION.

#### BIRMINGHAM AND MIDLAND COUNTIES BRANCH.

Thursday, October 12th, 1899. The President, Mr. BENNETT MAY, in the chair.

*Berger's amputation.*—Dr. Plummer showed a man on whom he had performed this operation. He was seen first in March after having been under treatment for two months for rheumatism of the right shoulder. There was wasting of the Deltoid and partial fixation of the joint, but no appreciable swelling. His father had died of phthisis. There was one very tender spot in front of the bicipital groove, and tubercular disease of the head of the bone was diagnosed. He was then sent to see Mr. Barling, who agreed with the diagnosis, and advised trephining if complete rest and counter-irritation gave no relief. At the end of April, as the patient was no better, the joint was explored and a mass of sub-periosteal growth was found enveloping the shaft and head of the bone. An attempt was made to remove this by excision, but the growth was too extensive, and as permission to amputate had not been obtained, the wound was closed. The growth was a spindle-celled sarcoma. Three weeks later the limb was removed by Berger's method, as

the glenoid cavity was involved. The patient made an uninterrupted recovery.

*The Influenza Heart.*—Dr. Saundby read a paper upon the effects of Influenza on the heart. These effects, although very common, have not so far been noticed by English writers upon heart diseases. The milder cases present only alterations in the force, frequency, or rhythm of the pulse. A weak, irregular, and intermittent pulse may persist for months after an attack of influenza, and be accountable for much of the languor of body and depression of mind so often observed in this connection. In the more severe cases the heart is dilated and is associated with the signs of cardiac failure. For the treatment of this form Dr. Saundby emphasized the value of a course of Schott treatment carried out either at Nauheim or at one of the many English watering places where all the needful arrangements exist.

*The Surgery of the Kidney.*—Dr. Deanesly read a paper on this subject, and advocated the advantage of commencing every operation on one kidney by a preliminary examination of the other kidney through a small abdominal incision.

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## REVIEWS.

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### ASTHMA.\*

WE cannot feel that this book is very convincing, or that it throws much light upon its nominal subject. What its real subject is it would perhaps be a little difficult to determine with any certainty; for it opens with the description of a pleximeter devised by the author, passes on to the anatomy of the normal heart, skims the subject of cardiac dilatation, the physiological

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\* Asthma: Recent Developments in its Treatment. By Ernest Kingscote, M.B., C.M., L.R.C.S. Edin. London: Henry J. Glaisier. 1899.

principles connected with the elasticity of the lungs, the relation between cardiac murmurs and dilatation and the relations of the latter to angina pectoris, and finally devotes 34 pages to the consideration of asthma itself. The rest of the book is given up to "Illustrative Cases," the majority of which were treated by the author.

The best part of that section of the book which deals with cardiac dilatation is the chapter on treatment, in which Dr. Kingscote describes the Nauheim system; and we note that he advocates the administration whilst the patient is in the bath of inhalations of oxygen. The succeeding chapter on the elasticity of the lungs and pulmonary suction contains also some interesting material.

The dissertation on asthma is largely founded on the subject matter of a small book already published by the author, "On so-called spasmodic asthma, considered from an entirely new standpoint with regard to its radical cure." His main idea is to the effect that a large number of cases of asthma are due to dilatation of the heart, and should be treated accordingly. But the question whether these cases are really cases of asthma at all is in our opinion by no means satisfactorily answered.

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#### MANUAL OF HUMAN PHYSIOLOGY.\*

THIS book is designed for the general reader or for those who may have to "get up" a certain knowledge of physiology without any previous training in biological science. The author has kept this in view, and therefore there is a freedom from technical terms and references to the more abstruse applications of physics to physiology. On the other hand, the writer states, as is most true, that to learn physiology from books is useless if not impossible. He therefore as far as possible introduces simple but demonstrative experiments which greatly add to the

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\* *Manual of Human Physiology.* By Leonard Hill, M.B. London: Edward Arnold.



usefulness of the book. As to the subject matter itself we do not think it calls for much comment. It is a clear and accurate description of the body functions. Many of the illustrations are familiar, many are new, while all are clear, which is the great point. The book is one which the junior medical student should know from cover to cover, and he will find that he has acquired much. There are others, however, who will profit by reading it. We have no doubt it will become as it deserves, a very popular introduction to the study of physiology.

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#### A HANDBOOK WITH HINTS FOR THE NURSERY.\*

THIS book does not pretend to be more than plain and practical suggestions to those having the care of children, and is in no way meant to be a medical book in the proper sense of the term. As far as it goes it is useful and would be of much service to nurses and young mothers. There are common sense directions for feeding, not babies only, but all young children. Several practical hints are given as to dealing with small or trivial occurrences in the nursery, and the making of poultices, etc. Clothing, sleeping, and exercise are not forgotten. The book is interleaved so that notes may be added.

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#### THE EDINBURGH UNIVERSITY GRADUATES' CLUB, BIRMINGHAM,

Held their Annual Dinner at the Grand Hotel on Friday, the 13th inst. The Chair was taken by T. Edgar Underhill, M.D., the Vice-chair by Ed. Vaudrey, M.D., of Derby.

The guest of the evening was Prof. Chiene, who, in replying to the toast of "The University," recalled many happy memories to those present, many of whom he knew well as students.

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\* A Handbook with Hints for the Nursery. By J. Macklean Carvell, M.R.C.S.

Prof. Chiene also made a touching reference to the loss of two prominent figures in the Academic life of Edinburgh, Prof. William Rutherford and Mr. John Duncan.

Songs were given by Drs. Morton, Poole, and Briggs, and recitations by Dr. Ratcliffe.

The Secretaries, Mr. Christopher Martin, M.B., and Dr. Douglas Stanley, were able to report a very satisfactory increase in membership.

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#### *PUBLISHERS' DEPARTMENT.*

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##### **New Inventions, Drugs, etc.**

We have received from the Zomēla Company further samples of their preparations. In a previous issue we stated that it was intended to apply the process already mentioned to different unguenta B.P., and otherwise. We have examined the preparations and find them excellent. The Ung. Plumbi cum Camph., Ung. Hydrarg. Amm. are particularly good, while the Ung. Eucalipti cum acid Carbol et Camph. is an instance of some of the special compounds made up by the Zomēla Company.

Messrs. Allen and Hanbury have sent samples of Phosote and Taphosote. The former is a phosphate of creosote, the latter a compound of phosphate of creosote and tannin. Both preparations are of a syrup-like consistence and fairly easily taken. Their object is to get over the difficulty experienced by some persons in taking any preparation of creosote. We have tried these preparations and they are to a large extent free from some of the well-known objections to creosote.

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##### **New Books, etc., Received.**

From H. K. Lewis—

*Rough Notes on Remedies.* By W. Murray, M.D.

*Contribution to the Surgery of Fractures and Dislocations of the Upper Extremity.* By J. E. Platt, F.R.C.S.



- From Oliver and Boyd—  
 A Manual of Modern Gastric Methods. By A. Lockhard Gillespie
- From Macmillan and Company—  
 Differential Diagnosis. By Frederick J. Smith, M.D.
- From James Maclehose and Sons—  
 Raynaud's Disease. By T. K. Monro, M.D.
- From Henry J. Glaisher—  
 Cancer. By Thos. W. Nunn, F.R.C.S.
- From John Wright and Co.—  
 A Guide to Urine Testing. By Mark Robinson, L.R.C.P. & S.
- From Shaw and Sons—  
 Shaw's Manual of the Vaccination Law.
- From John Bale, Sons, and Danielsson—  
 The Prevention of Eye Accidents. By Simeon Snell, F.R.C.S.
- From the Government Printing Office, Washington—  
 Index Catalogue. Surgeon-General's Office. Vol. iv,
- From the Clinic Publishing Company, Chicago.  
 Colpoperineorrhaphy.
- We have also to acknowledge the following—  
 South African Health Resorts.  
 Denstone College.

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\*\*\* Authors can have reprints of articles at the following rates:—

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THE  
BIRMINGHAM MEDICAL REVIEW.  
DECEMBER, 1899.

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ORIGINAL COMMUNICATIONS.

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THE BRADSHAW LECTURE  
ON  
THE CAUSATION OF FUNCTIONAL HEART  
MURMURS.

*Delivered before the Royal College of Physicians, of London,  
on November 2nd, 1899.*

BY ARTHUR FOXWELL, M.A., M.D., CANTAB.,  
FELLOW OF THE COLLEGE;  
PHYSICIAN TO QUEEN'S HOSPITAL, BIRMINGHAM; LATE EXAMINER IN  
MEDICINE AT THE UNIVERSITY OF CAMBRIDGE; PROFESSOR OF  
THERAPEUTICS AT MASON UNIVERSITY COLLEGE, BIRMINGHAM.

*(Continued from page 276.)*

III.—There is one *post-mortem* abnormality, which is constantly found in patients who have died with this functional pulmonary murmur—that is, dilatation of the conus and pulmonary artery with a carrying up of the root of the artery, so that in the supine condition it tends to lie directly over its bifurcation.\* Is this the cause of the murmur? I believe it is and for the following reasons:—

1. The murmur is systolic only; there is never a diastolic portion: hence the orifice of the valve cannot be dilated enough to allow of leakage. *Post-mortem* evidence bears this out, for there

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\* *Vide* Cases 3 and 4 *supra*.

was no increase in size in two valves which I measured. We have, therefore, a tube with an annular constriction (Fig. 7),

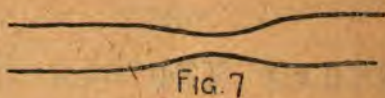


FIG. 7.

a condition well known as able to induce a murmur.

2. The dilatation of the conus carries the pulmonary artery upwards till the valves are vertically over the bifurcation, which is a fixed point (Fig. 8)—*i.e.*, it lessens the distance between the



FIG. 8.

two ends of the artery; the artery therefore tends to fold itself longitudinally, as does the curly brachial in cases of arterial degeneration. This lack of longitudinal tension to a great extent renders the restraining force of the longitudinal fibres of no effect; hence dilatation, being now prevented by the circular fibres only, is much more likely to occur and a pouch-like distension to be produced by the systolic inrush of blood; hence eddies and a murmur.

3. The same want of room and laxness will increase the artery's tendency to flatten itself against the comparatively rigid chest wall and aortic arch, this flattening acting as a partial constriction and so again tending to induce eddies and a murmur.

4. The anterior wall of the pulmonary artery is carried up farther than the posterior wall. One would expect the anterior muscular portion of the conus to stretch and not its posterior ligamentous surface. Moreover, the union of the posterior wall of the pulmonary artery to the aorta would prevent upward movement of the former. Case 6 shows that this actually takes place, the anterior segment of the pulmonary valve being in this



instance some half an inch higher than the posterior one. The plane of the valve ring is, therefore, not perpendicular to the longitudinal axis of the artery and the systolic inrush of blood would tend to direct itself against the side of the vessel and thus induce an eddy and a murmur; further, the anterior wall is also more shortened than the posterior wall and would be laxer and tend more to sag. In fact, the systolic rush of blood would tend to take the direction indicated by the arrows in the accompanying diagram (Fig. 9), a direction evidently murmur-producing.

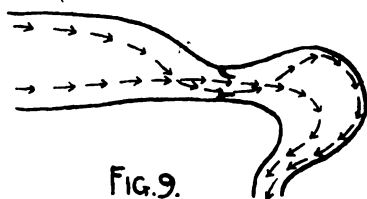


FIG. 9.

5. The movement of the apex upwards and to the left still further alters the angle at which the ventricle lies to the pulmonary artery. This movement of itself would appear to be sometimes capable of inducing a murmur, as the murmur which arises with a left pleural effusion and vanishes *at once* on the withdrawal of the fluid would tend to show.

6. This view would easily explain the increase of the murmur in the supine position. When erect the weight of the heart tends to keep the pulmonary artery and conus on the stretch and so to prevent or lessen their dilatation. In the erect position the ventricle has to force the blood into the artery against gravity and would therefore do so with less power. Lastly, as the systemic tension is lower in the erect than in the supine posture, probably this is also true of the pulmonary circulation; hence the pulmonary artery and conus would be less stretched in the erect posture.

7. It would evidently explain the outline of dulness and also the position of the apex; for if the dilated conus pushes the pulmonary valves upwards it must also equally push the ventricle below it down on the unyielding tendinous portion of the

diaphragm, and thus, after the manner of a see-saw, push the apical part up and out.

So far, then, I have given you direct as well as circumstantial evidence that the murmur is not due to any changes in the blood, and I trust that this evidence will prove satisfactory to you; but I have only been able to advance circumstantial evidence that it is due to a dilatation of the conus and pulmonary artery. To my mind, though circumstantial, this evidence is so strong that I have for long given this explanation of the murmur to students, but feeling that direct evidence is much more convincing I have this year endeavoured to obtain such.

I set myself three questions to answer: First, can this murmur be always heard after death in a heart over which it was heard during life? Secondly, is it never heard after death in the healthy heart? And, thirdly, can the murmur be produced after death by locally dilating the conus and pulmonary artery of a healthy heart?

To these three questions I believe I have obtained affirmative answers which I will now submit to you for your consideration.\*

First, let me describe the method of procedure. After removing the carapace from a cadaver on the *post-mortem* table the large vessels were cut as long as possible, and then the heart and pericardium were removed together, great care being taken not to puncture the latter organ. The heart thus isolated was placed upon a wooden block on a *post-mortem* table (*vide* diagram Fig. 10, and photograph of the apparatus, Fig. 11). Into the superior vena cava and into a pulmonary vein were fastened two leaden pipes having an internal diameter of one inch, the ligatures including the pericardium. At the other end of each

\* I would here gladly acknowledge the great help which my able assistant and pupil, Mr. W. Billington, has given me; to his skill and ingenuity the success of this investigation is largely due. I would also heartily thank my colleagues, both medical and surgical, for the *carte blanche* way in which they gave over to me any hearts at their disposal. I feel greatly indebted to the forbearance of our pathologist, Dr. Douglas Stanley, for allowing me to use the *post-mortem* room as a laboratory for so long a period, and to the enthusiastic help and scientific knowledge of my house physician, Mr. W. H. Coltart, I indeed owe much.

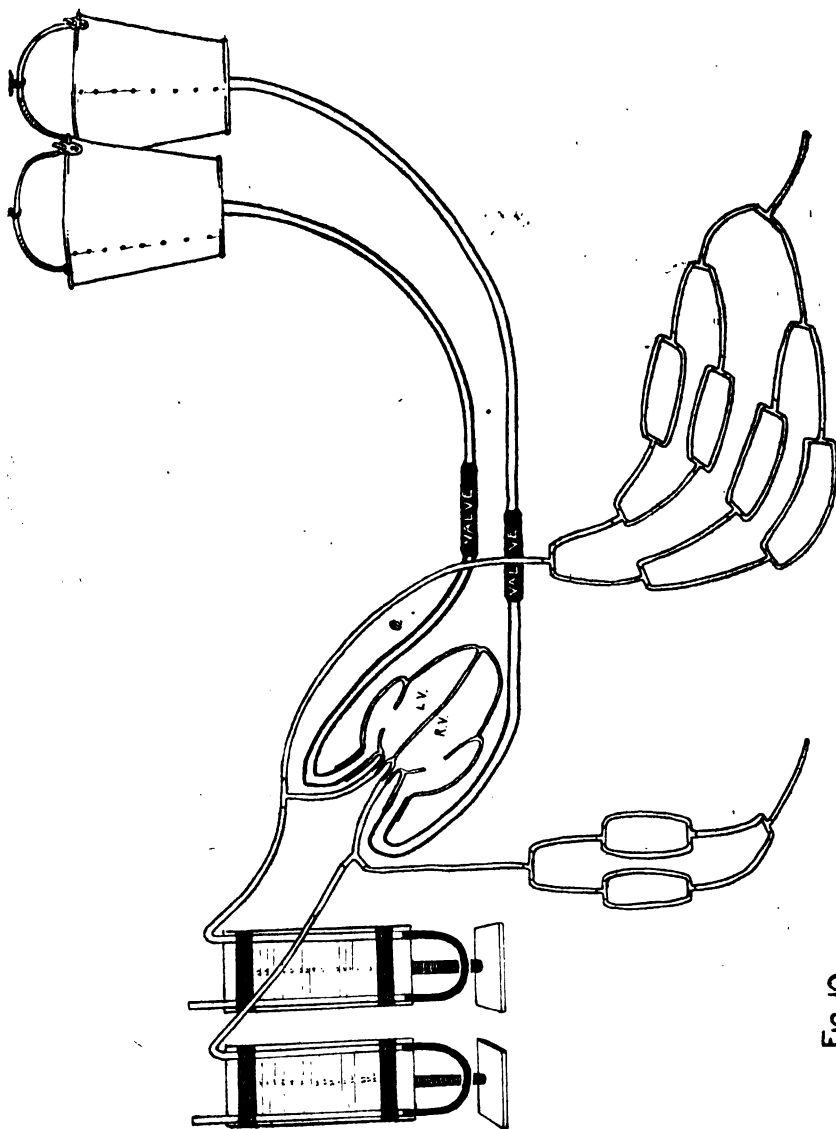
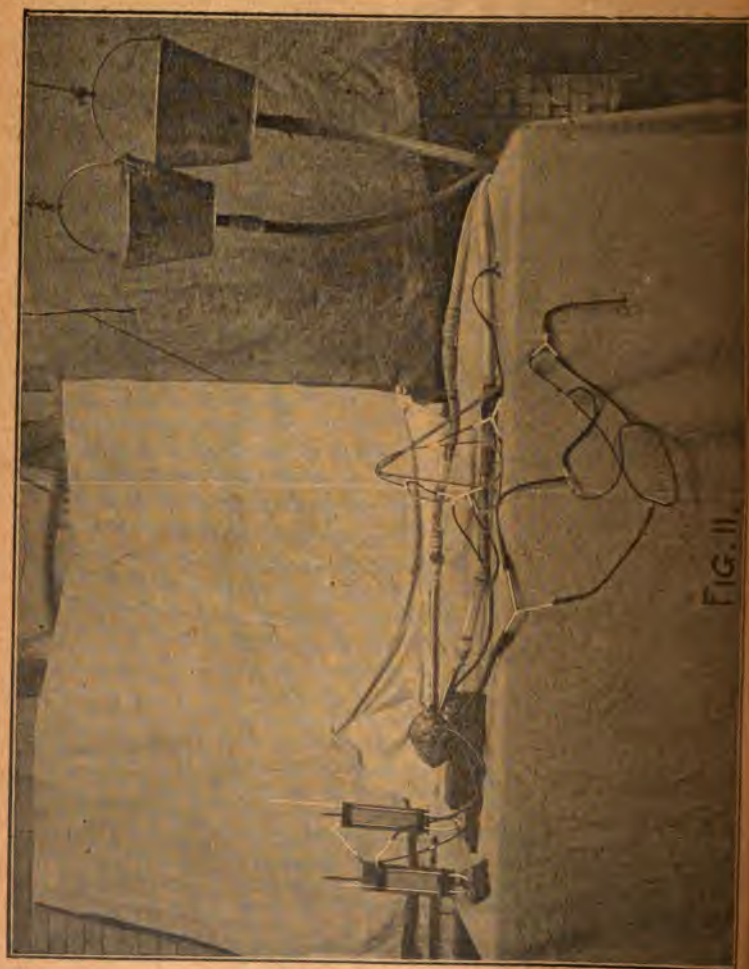


FIG. 10.





of these rigid tubes was a valve which prevented any back flow from the heart, thus acting as mitral and tricuspid valves respectively. Beyond the valves stout rubber tubing of the same diameter led to two buckets which were suspended on pulleys, so that they could be lowered or raised at will and thus vary the venous supply pressure. The buckets were kept full by connection with water-taps. Into the aorta and one limb of the pulmonary artery were similarly fastened two glass T tubes, that in the pulmonary artery having a diameter of two-thirds of an inch and that in the aorta of half an inch. One limb of each T was connected with a mercurial manometer and the other was passed into a series of lessening and bifurcating tubes to represent the resistance of the pulmonary and systemic circulations. It will be noted that the bore of the glass T's is less than that of the arteries; it may be thought that such diminution would tend to induce a murmur; yet as the bore of the aortic T is less than that of the pulmonary, such tendency would be greater in the aorta, yet in no instance was there evidence of such tendency in this vessel, so that this contraction of bore had no effect on the result. When everything was fixed in position the heart was firmly grasped in the two hands of one of us and forcibly compressed, whilst another listened through a binaural stethoscope applied to the heart.

There are three objections to this method. 1. The auricles are subjected to the same systolic pressure as the ventricles and thus occupy too much space during systole; but as each auricle and ventricle practically corresponded to one ventricle the auriculo-ventricular valves being outside the heart, this defect was of small moment. 2. The difficulty of exerting different pressures on the left and right side; we were surprised at the ease with which this was overcome; with a comparatively small experience it was quite possible to make the manometer connected with the aorta average twice the pressure of that connected with the pulmonary artery. 3. The passivity of the heart. This acted in two ways: (a) the venous inflow had to distend inert cavities, hence the diastole took far longer than during life unless



we made the venous pressure absurdly large; and (b) the septum being lifeless it was pushed into the right ventricle, when the pressure in the left heart greatly exceeded that in the right, and thus tended to occlude the conus. We were therefore compelled to work with pressures of about 80 millimetres and 140 millimetres on the right and left sides respectively when we used both sides together, but we corrected our results by trying the left side alone at 200 millimetres. We found that no tendency to murmur arose in the aorta on doing so.

On the other hand, there were two circumstances which militated against the production of a pulmonary murmur after death by our method as compared with the condition of the heart during life. First, there was nothing to compress the dilated artery and conus, no rigid thoracic wall or aortic arch; and secondly, the weight of the glass T tubes, which hung more or less perpendicularly, tended to stretch the arteries and thus to prevent any attempt at bagging. The first of these conditions we soon learnt the importance of, for any compression of the vessel by the stethoscope easily intensified the murmur.

Such was the method finally adopted, but many varieties of apparatus were first attempted. Most of these were too crude to give trustworthy results and I have not included the experiments made with them in the following list. At the same time I would say that they all bore out the same conclusion and not one of them gave a contradictory result.

One variation in the apparatus I must describe, as with it the first six experiments here recorded were performed. In this two easily compressed pieces of rubber tube took the place of the valves and these were constricted by pressing the edge of a piece of wood upon both with one's hands from 60 to 80 times a minute, the operator being guided by a watch laid on the table. Whilst the constriction was made diastole occurred, and systole took place when it was removed. It is evident that the systolic pressure was now obtained by the weight of water from the buckets, and these were raised to equal 80 millimetres and 200 millimetres of mercury respectively. There were two objections to this method: first, the heart was never emptied and

neither set of semilunar valves could be brought into play ; and secondly, and most importantly from the murmur point of view, each ventricle and artery tended to become one dilated tube and a murmur due to local bulging would occur less readily than when the ventricle was steadily decreasing in size as the systole continued.

I regret to say that even including these six I have a very small number of experiments to present to you. Were it not that they all point the same way I should have hesitated to bring them forward at all. But it has not been an easy investigation to take up ; the hearts had to be free from valvular disease and had to be made use of as soon as they chanced to appear, which did not always coincide with a period of leisure ; moreover, each experiment took three hours in its performance. Not that I in any way grudge the time for, apart from the purpose in hand, it has amply repaid me by the intimate knowledge which it has given me of the potentialities of the heart under varying conditions of strain. With this epd alone in view it would be well worth the while of any young physician to repeat them.

Generally, we were assisted in our observations by one or more of the hospital residents or senior students and, to remove as far as possible all tendency to bias, no one stated his opinion till all had examined, and mine was stated last. Further, as we were generally ignorant of the cardiac condition before death, we were able to maintain open minds. The method employed was not capable of investigating tricuspid or mitral murmurs, but incidentally it convinced us that pressure upon the pulmonary artery by the left auricle, with a murmur arising from the constriction of the artery, was a practical impossibility so long as the pericardium remained intact, for even when the auricle was subjected for a considerable time to systolic pressure approaching 200 millimetres it never dilated sufficiently to encroach upon the artery ; not even when, as I have stated above, the difference of pressure was enough to so displace the septum ventriculorum as to occlude the conus.



Another collateral result was the negative evidence obtained as to the origin of the murmur in the aorta. Several times we experimented with the left side only and endeavoured to produce a murmur by subjecting it to pressures of over 200 millimetres Hg, using for this purpose hearts several days after their removal from the cadaver, but we never succeeded in gaining any dilatation approaching that of the pulmonary artery, and only once obtained a murmur. Curiously, this murmur was the single exception which proves the rule, for (*vide* Experiment 21) on examining the aorta and its valves we found both the subject of aortitis, so that the murmur was no doubt an organic and not a functional sound.

Perhaps the greatest revelation which these experiments gave us was evidence of the manifold uses of the pericardium, especially the importance of its action as a cardiac support. We divested a sheep's heart of its pericardium and three hours after death it withstood the usual pressure (80 millimetres Hg on the right side) well, but 17 hours later it dilated so greatly and leaked so much through the substance of the right auricle and right ventricle that it was of no use for experimental purposes. The same dilatation and leakage had occurred with the human hearts which we had previously employed. The experiments did not, as a rule, take place within 20 hours of death, yet we thought that the breakdown might be due to disease and not simply to the death of the tissue. But after trying with one or two sheep's hearts and finding that they gave way equally with those of human beings we kept the heart in its pericardium and were surprised to find its condition maintained for two or three days after death. We were thus at once provided with a ready way of producing dilatation of any portion—viz., by making a window in the pericardium at the spot and allowing the heart substance to bulge through the opening. When such a window was made over the aorta not much bulging and no murmur arose, but if a similar opening was cut over the conus and pulmonary artery considerable bulging always occurred and usually a murmur was developed, whether this had existed previously or no.

The hearts we experimented with may be divided into three classes: (1) those which showed no signs of weakness either during life or after death; (2) those which, though weak, had no pulmonary murmur during life, but showed evidence of dilatation or degeneration after death; and (3) those in which a pulmonary murmur existed during life. (In some of these a mitral or tricuspid functional murmur was also present, but in no case was there any diastolic murmur.)

The method employed was as follows. It was first noted whether any abnormal sounds arose when the pericardium was intact; then a small portion was cut away over the pulmonary artery and the heart again auscultated. Still more was then removed till the dorsum of the artery and the conus arteriosus bulged into the gap, when the observation was repeated. Lastly, the whole pericardium was removed and a final auscultation made.

Generally, the results obtained were these: 1. Healthy hearts with the pericardium intact gave no murmur; when it was removed from the pulmonary artery and conus at first there was no murmur and often none arose even though the heart was subjected to repeated compression for a long time, but, as a rule, sooner or later, especially if the heart were kept a day or so, bulging of the unprotected portions arose and was accompanied by a murmur. On removing the pericardium entirely, though the heart as a whole greatly dilated, sometimes to twice the previous size, yet no murmur was detected. 2. Hearts in which no murmur was noted during life but which had undergone dilatation and, perhaps, some fatty change. Still no murmur occurred with the pericardium intact unless the pressure used were very great or the heart had been dead a long time (from two to four days), but on partial removal of the pericardium one nearly always occurred, and if it had been previously present it was increased, this increase again lessening or vanishing when entire removal of the pericardium was effected.

3. In the third class of hearts, where a murmur existed during life, this was always found with the pericardium intact, it



increased with its partial removal, and reverted to its previous character on total removal of the pericardium. The murmur thus heard bore usually the characteristics of that heard during life. It was harsh and blowing, was heard loudest sometimes over the pulmonary trunk, sometimes over the conus; it was never well conducted, and, though generally audible over the aorta, its loudness was greatly diminished there. Even with healthy hearts in an intact pericardium this murmur could always be produced by pressure, amounting to indentation, on the dorsum of the pulmonary; but whereas in healthy hearts this indentation had to be considerable, when the artery was already dilated far smaller indentation would induce a murmur. It was always very difficult to produce such a pressure murmur in the aorta, and on no occasion did a murmur arise in this vessel if the left heart alone were distended with fluid and compressed in the usual way. On the contrary, if the right side only were distended the pulmonary murmur arose as readily, or even more readily, than when both sides were distended.

*Experiment 3.*—The patient, a male, died from cystitis and suppurative nephritis. The condition of the heart before death was not known. After death all the four cavities were dilated and the left ventricle was hypertrophied. There was some fatty degeneration of the muscle and some atheroma of the mitral and aortic valves and of the aorta and both coronaries. Pericardium intact: a short systolic murmur was best heard over the conus, but was also audible over the whole of the right ventricle, over the pulmonary valves, and the pulmonary artery; it was heard at the commencement of systole only, disappearing as soon as the artery was fully filled, and did not reappear so long as a steady stream was maintained. Pericardium removed from the artery: the pulmonary artery at once bulged forward and to the left and became much dilated. In addition to the above systolic murmur the *second* part of the systole was also accompanied by another murmur, this latter becoming continuous when a steady stream was maintained. The pericardium was now cut away from the conus as well and

this at once bulged prominently into the opening. Precisely similar but louder murmurs were again heard. Pericardium entirely removed: the sounds were the same as with the pericardium intact, but the continuous murmur could be at once reproduced by (considerable) indentation of the pulmonary artery.

*Experiment 4.*—A woman, aged 34 years, died from gangrene of the leg; no account of the heart was obtainable before death. After death the kidneys were found to be granular; the whole heart was much enlarged, the walls of both ventricles showing extensive fatty degeneration—that of the left ventricle was three-quarters of an inch thick, whilst the muscle layer of the right ventricle only measured  $\frac{1}{3}$  of an inch. The valves of the right side were healthy; those of the left were thickened. Pericardium intact: no murmurs. Pericardium removed from the pulmonary artery and conus: short systolic murmur. With pericardium intact there was also a short systolic murmur if stethoscope indented the artery or conus.

*Experiment 5.*—Heart from a man, aged 39 years. Death occurred from pneumonia of the right upper and middle lobes. The temperature averaged 103°F. The specific gravity of the urine was 1020 with a cloud of albumin. The heart's apex was in the normal situation, but the impulse was feeble; there were no murmurs. After death the heart was soft and flabby; the muscle showed cloudy swelling. Pericardium intact: no murmur. Pericardium partially removed; murmur appeared *at once*. This case shows the tendency pneumonia has to especially weaken the conus and pulmonary artery.

*Experiment 6.*—Heart from a youth aged 19 years who had suffered from leukaemia and purpuric hæmorrhage with constant pyrexia, averaging 101°F. Red corpuscles, 1,890,000; white corpuscles, 206,000; hæmoglobin, 30 per cent.; specific gravity, 1035. The heart's apex was normal in situation, but pulsation was most marked in the fourth space. There was vertical dullness at the upper border of the third cartilage, and right dullness at the left edge of the sternum. There were soft systolic



murmurs at the apex and in the pulmonary area. The spleen and liver were enlarged. Pericardium intact: distinct systolic murmur over the pulmonary artery and conus, heard best just over the valves; it shortened on raising the pressure of the fluid in the left heart. This is the heart I have shown you distended with paraffin, therefore I can give you no description of its condition. On removing the pericardium from the artery only, the murmur is increased but, if anything, shortened. The artery has a distinct crescentic antero-sinistral bulge over which the coat seems thinned. The murmur is very well heard over the upper two-thirds of the right ventricle. On further removing the pericardium from the conus a distinct bulge of the conus is noted, even before any distension of it is produced. Now the murmur is louder than when the pericardium was intact.

*Experiment 7.*—A woman, aged 35 years, who had suffered from obstructed common bile-duct. Much hectic fever before operation; soon after operation she had an obstructed umbilical hernia for which no operation was permitted and which caused death. This heart was experimented upon four days after death in hot weather. It was somewhat decomposed and both valves were dilated. The muscle was pale and there was much fatty infiltration. Only the left heart was used to see if the aorta uncovered by pericardium could be dilated by pressure in a manner similar to the pulmonary artery. It was subjected to a pulsating pressure of 140 millimetres, but no dilatation of the aorta could be detected.

*Experiment 8.*—A woman, aged 50 years, who had suffered from chronic focal myelitis. After death the kidneys were granular, the coronaries were thickened, and the heart was fatty. No murmurs were mentioned as having been heard before death. At first the double circulation was well maintained with a pressure of 150 millimetres on the left and 80 millimetres on the right, but 24 hours later, whenever the circulation on the left side rose much above that on the right, the circulation in the latter ceased. This was no doubt owing to bulging of the septum towards the right and so occluding the cavity of the conus

Naturally this could not occur during life, as then the septum is not inert but actively contractile. Pericardium intact; no murmur. With pericardium removed from the pulmonary artery only, a systolic murmur arises. This remains unchanged when the pericardium is also removed from the conus, but vanishes with the complete removal of the pericardium. If free exit was given to the fluid from either aorta or pulmonary artery, so that these collapsed during diastole, then in *either* vessel a murmur arose with their re-distention in systole. This indicates the power a flabby vessel which cannot contract firmly on its contents possesses of producing a murmur. Is this the cause of the murmur which occasionally arises in the pulmonary area immediately after a large hæmorrhage?

*Experiment 9.*—A man, aged 72 years, who suffered from fracture-dislocation of the cervical spine. No observations were made before death. After death the heart was much decomposed and somewhat dilated. Pericardium intact: systolic murmur over the pulmonary artery and conus. Pericardium removed from the pulmonary artery and conus: the systolic murmur is longer and louder, but the change is not marked.

*Experiment 10.*—A man, aged 29 years, who died from carcinoma of the liver. There was nothing abnormal in the heart before or after death. Pericardium intact, no murmur.

*Experiment 11.*—The patient was a man who died from depressed fracture and cerebral hæmorrhage. No notes of the heart were taken before death; after death the heart was healthy but much decomposed. Pericardium intact; no definite murmur. Pericardium partially removed; definite systolic murmur.

*Experiment 12.*—The patient was a man who died from general tuberculosis. Before death no note was taken of the heart; after death all the cavities were dilated and the muscle was pale and flabby. Pericardium intact; no definite murmur. Pericardium removed from pulmonary artery and conus; quite definite systolic murmur. Pericardium also removed from aorta; systolic murmur less well heard. Pericardium entirely removed; sounds same as with it intact.



*Experiment 13.*—A woman, aged 40 years, who died of a fractured jaw, gangrene, and pneumonia. No notes were taken concerning the heart before death. After death it was flabby, but fairly muscular and of moderate size. Pericardium intact; a feeble systolic murmur was heard, but when the peripheral resistance was too small to keep the pulmonary artery distended then the murmur became loud and harsh, especially during the first half of systole before the artery was distended. The murmur could be heard over the aorta and conus but was only feebly conducted. Pericardium removed from pulmonary artery; murmur became more marked and longer. Pericardium removed entirely; murmur almost vanished. There may have been a pulmonary systolic murmur in this case before death as there was pneumonia, which puts special strain on the right ventricle; but, if not, the heart was very weak and no doubt acted feebly before death at a much less pressure than that to which we subjected it; our greater pressure was sufficient to produce dilatation with its consequent murmur.

*Experiment 14.*—The patient was a man, aged 50 years, who suffered from subacute nephritis. For two days after admission there was a distinct pulmonary murmur; this afterwards vanished. After death the liver was somewhat fatty and there was no general oedema. The coronaries were much thickened, the tricuspid valve measured five and a quarter inches in circumference and the pulmonary four and a half inches; the wall of the left ventricle was seven-eighths of an inch in thickness, the septum was three quarters of an inch, and that of the right ventricle from one-quarter of an inch to three-sixteenths of an inch. The pulmonary artery appeared considerably dilated, the conus not more than the rest of the right ventricle and so much as the right auricle. Pericardium intact; systolic

\* This is interesting as showing the effect of rest from short exertion on the cause of the pulmonary murmur, for the man was too ill on admission to have lately undergone any lengthened labour. Hence he had no mitral leakage; and, with the relief from any special strain given by rest, he soon ceased to have a pulmonary murmur, though the heart remained weakened and easily dilatable.

murmur was heard but no diastolic. Pericardium removed from pulmonary artery or from whole heart produced very little difference in the nature of the systolic murmur, but the experiment was continued for a short time only so that not much stretching could occur.

*Experiment 15.*—The patient was a youth, aged 16 years, who suffered from acute anæmia following a blow on the head eight weeks previously. On August 13th the red corpuscles equalled 770,000, and the white corpuscles equalled 2000; hæmoglobin equalled 15 per cent. On August 27th the red corpuscles equalled 450,000, and the white corpuscles equalled 2000; hæmoglobin equalled less than 10 per cent. Red cells varied in size and outline, but there was no marked poikilocytosis; the white cells were chiefly lymphocytes. The apex beat was slightly internal to the left vertical nipple line in the fifth space; there were systolic murmurs in the mitral and pulmonary areas. There was a venous hum in the neck. After death there were marked emphysema, œdema, and collapse of the lungs. There were some submucous hæmorrhages in the alimentary tract and the solitary glands were much enlarged. The heart's apex was in the left vertical nipple line and the fourth space: the pulmonary valves lay beneath the middle of the first left space. The pulmonary artery was not markedly enlarged, but the tissue of the conus was fatty. Pericardium intact; a systolic murmur was heard best on the left side of the pulmonary artery, next best on the right side, and scarcely at all on the dorsum. As the compressions continued (and dilatation increased) the murmur grew louder. Pericardium removed from conus and artery; the murmur was increased and continued to increase as the heart continued to give: it was still heard best in the same situations and scarcely at all over the aorta. Pericardium quite removed; heart dilated greatly, but the murmur grew less loud.

*Experiment 16.*—The patient was a man, aged 47 years, who suffered from hepatic cirrhosis, œsophageal hæmorrhage and ascites. After a severe hæmorrhage an apical systolic murmur appeared, which lasted a week, then vanished, and did not



reappear.\* The apex beat was in the fourth space one and a quarter inches without the left vertical nipple line. There was vertical dulness up to the lower border of the second space. There was right dulness at the left edge. A systolic murmur was heard in the first four left spaces and slightly at the apex beat, but chiefly in the second and third. After death the apex beat was in the fourth space three and half inches from the middle line; the right edge was one and a quarter inches from the mid-line (opposite the fourth cartilage). The heart was enlarged and fatty; there was some atheroma, especially of the coronaries. Pericardium intact; a slight systolic murmur. Pericardium removed from pulmonary artery and conus; systolic murmur more marked. Pericardium entirely removed; systolic murmur much less distinct.

*Experiment 17.*—The patient was a man, aged 31 years, who suffered from acute pneumonia. Heart dulness was normal and there were no murmurs. After death the heart was seen to be very large; the tricuspid measured six inches and the pulmonary artery four inches. The wall of the left ventricle was fatty and there was some myocarditis. Pericardium intact; no murmur. Pericardium removed from conus and pulmonary artery; distinct but soft murmur. Pericardium entirely removed; a much less distinct murmur.

*Experiment 18.*—The patient was a man, aged 32 years, who suffered from fractured base. This was the same heart as that used in Experiment 2. It was macroscopically healthy, but as the experiment was performed eighty hours after death considerable decomposition and weakening of the walls had no doubt taken place. Pericardium intact; at first a soft murmur was heard both over the pulmonary artery and the aorta; it was then noted that there was a bulge of the pulmonary artery on its aortic side where the pericardium had been torn away; the pericardium was drawn over this bulge and stitched together, then this murmur vanished. Pericardium removed from conus and

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\* The patient was confined to bed, *vide* Experiment 14. If he had been up and about no doubt the murmur would have continued.

pulmonary artery; the usual loud systolic murmur was heard over the pulmonary artery and the aorta. Pericardium removed entirely; no murmur heard.

*Experiment 19.*—The patient was a man, aged 25 years, who died from a fall of forty feet. There was no disease of any organ. The heart was large but in good condition. Pericardium intact; no murmurs. Pericardium removed from conus and pulmonary artery; no murmur, but first sound became impure.

*Experiment 20.*—The patient was a man, aged 23 years, a draughtsman, who suffered from subacute Graves's disease and who died from shock two hours after removal of the goitre. Before death the apex beat was in the fifth space (half an inch external to the left vertical nipple line). There was vertical dulness in the upper border of the fourth cartilage, and right dulness at the left edge of the sternum. There was a systolic murmur at the lower border of the third left space, loud and harsh, rough and short; it was well conducted upwards on both sides of the sternum and reached the vessels of the neck and was much increased by pressure of the stethoscope. Only a partial *post-mortem* examination was allowed. The organs were removed through the wound. The lungs, the pleuræ, and liver appeared to be healthy; no adhesions were noted in the chest or the abdomen. The heart also seemed healthy, the wall of the left ventricle being in remarkably good condition, but that of the right ventricle was thin. With pressures of 80 and 200 millimetres the following results were obtained. With the pericardium intact a harsh and loud systolic murmur was heard, chiefly over the conus; it was heard very slightly in the pulmonary artery, no better, in fact, than it was in the aorta. Also a loud murmur was heard in the same situation throughout the diastole; this was when the venous (diastolic, pressure in supply pipes) was 50 on each side and it became faint on lowering this pressure to 15. If the pressure in the pulmonary circuit was increased, the systolic murmur was intensified, and when this pressure reached 200 its loudness



was doubled. It was noted that as the pulmonary pressure approached that in the aorta the systolic murmur was better conducted to this vessel. On removing the pericardium from the aorta the audibility of the systolic murmur over this vessel was lessened. On removing it from the pulmonary artery and conus the systolic murmur became louder and was well heard all along the pulmonary artery, but it was less well heard in the aorta, especially if the difference of pressures was maintained. With the pericardium entirely off the systolic murmur was as when the pericardium was intact, except that it was better heard along the pulmonary artery.

*Experiment 21.*—The patient, a man, aged 31 years, died from acute anæmia of four weeks' duration. The liver and spleen were enlarged. The apex beat was at the fifth rib and the left vertical nipple line. There was vertical dulness at the upper border of the third cartilage and right dulness a little to the right of the left edge of the sternum. Systolic murmurs were heard over the apex and pulmonary area and a soft systolic murmur, probably conducted from the left, in the second right space. After death the heart was flabby but not much dilated. The tricuspid valve measured  $5\frac{5}{16}$  inches, the aortic valve  $3\frac{1}{4}$  inches, and the pulmonary valve  $3\frac{1}{2}$  inches in circumference. Scattered throughout the aorta and reaching up into the innominate and left carotid were remarkable bosses, almost ulcerated in places, of acute inflammation (hæmorrhagic aortitis). Pericardium intact: systolic murmur was heard; this was usually well heard in the aorta, sometimes so well heard there that it was doubtful in which vessel it arose [cf. condition of aorta and murmur of aortic degeneration]. Pericardium removed from conus and pulmonary artery: the murmur was much increased, but more over the pulmonary artery and conus than over the aorta. Pericardium entirely removed: murmur very feebly heard. Pressure on the pulmonary artery much more easily induced a murmur than similar pressure on the aorta even when the tension in both vessels was the same.

I trust that I have convinced you of two things: first, that in

cases of cardiac debility there is often a localised dilatation of the conus arteriosus and pulmonary artery; and, second, when in these cases a murmur arises in the second and third left spaces this murmur is due to such localised dilatation. But before I finish, though I have done what I set myself to do, yet I would like to point out several *à priori* reasons why we should expect such dilatation to take place. Debility is not a local but a general disease; the whole body is enfeebled owing to an insufficiently energetic metabolism. The heart also suffers as a whole, no one portion of it being more enfeebled than the rest. The weakness of the left ventricle is shown by the small and feeble pulse, incontrovertible evidence that the ventricular cavity is only partly emptied at each systole. But this does not mean any special failure on the part of the left ventricle; there is nothing to show that it is unable to keep pace with the lessened needs of the debilitated body. The body and ventricle fail together and equally, and hence there is no reason why the ventricle should show signs of strain. Both ventricle and body will tire soon; they are incapable of continuous toil, mental or physical, but they get tired together and so neither suffers undue strain.

If this is the case with the left ventricle, why should it not be so also with the right? It would be if everybody were debilitated; if we lived in a land where it was always afternoon, a land of sloth and idleness. But the surroundings of the sufferer from debility are too much for him; he cannot avoid catching somewhat of the spirit of emulation; moreover, this same debility renders his nervous system more irritable, less capable of self control, so he tries to keep pace with the healthy ones around him and, however much he may strive to take life easily, he must work against time now and then. The school-boy is told to do as many sums as he can in an hour, he has to rapidly answer questions passed from one to another, he plays games which ever and again necessitate sharp bursts of exertion. The housemaid has to run upstairs quickly to answer her mistress's bell, is bound to carry heavy trays and scuttlefuls of



coal—all these short strenuous exertions are a healthful stimulus to the normal constitution, but to the debilitated they come as a breathless and exhausting labour. It is true he cannot keep them going for any length of time; he soon is obliged to leave them undone or finish them very slowly; thus he saves his left ventricle and body generally. In course of time experience teaches him perhaps to forego attempting their initiation, but experience, though an excellent, is yet a costly teacher; often, especially if the patient be young, the mischief is done ere the lesson is learnt. On what part of the body falls this mischief? What portion has to sustain the brunt of the shock of any sudden exertion—has to play the buffer to the rest? I think it is the lungs and next the right ventricle.

Physiologists\* tell us that the first result of exercise is an increase in the rate and depth of the respirations—that is, of the respiratory exchange. That the respiratory quotient,  $\frac{\text{CO}_2}{\text{O}_2}$ , is not increased, but if anything diminished; in other words, the tissues are as rich (or richer) in oxygen during exercise as during rest. This necessitates a great increase in the absorption of oxygen at this time, for E. Smith has shown that a man gives off ten times as much carbonic acid when on the treadmill as he does when asleep. But what I would particularly draw your attention to is this—that arm work, *per unit of work done*, requires a greater absorption of oxygen than climbing, and climbing than walking on the level. If the amount of oxygen absorbed during sleep per minute be 100 grammes, then in a minute's walking at three miles an hour on the level it would be 500 grammes; in climbing a yard high 5,000 grammes, and in doing the same amount of kilogrammetres by turning a wheel (arm work) 7,000 grammes.

Such an enormous increase in the absorption of oxygen and giving out of carbonic acid must seriously strain the resources of the organs concerned. The lungs are rarely at fault, for they have so much unused tissue which they can bring into play

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\* Pembrey in Schaefer's Physiology, vol. i, pp. 714 et seq.

and so many extraordinary muscles that they rise equal to almost any emergency.

This increase in pulmonary action is probably brought about by some product of muscular activity stimulating the respiratory centre of the medulla, but such stimulation would be of small avail were not the right ventricle similarly stimulated to supply the lungs more rapidly with blood. Such a stimulus is provided by the extra flow of blood from the veins, this being induced by the aspirating action of the increased inspirations. Thus, as regards the circulatory system, on the right ventricle and pulmonary artery falls the first brunt of the extra labour; and when this is undertaken suddenly, as in a run upstairs, the shock it gives to these organs must be extremely great.

It is true that the extra toil must soon fall on the left ventricle also, but it does so more gently and with far less suddenness, for (a) the extra blood can only reach it through the devious elasticity and dwindling pressure of the pulmonary system; (b) the systemic circulation in debility is but partly full, so that several systoles are occupied in properly filling this, and thus the left ventricle is allowed a short period in which to brace itself up for its extra work; (c) if it be unequal to this extra work it can easily refuse to receive all the blood sent to it, for it is no strain on a high-pressure cylinder to reject fluid sent it from a low-pressure one through elastic tubing; (d) if it does so reject the blood the great dyspnoea thus excited soon puts an end to the patient's exercise and thus at once eases the left ventricle, whilst the blood thus blocked in its flow through the lungs must be a terrible additional shock to the right heart and pulmonary artery; (e) in any case general exhaustion soon stops any sharp, strenuous toil on the part of a sufferer from debility, hence the left ventricle is not likely to be severely taxed.

Again, the increase in respiration must increase the difference in the intra-thoracic pressures in inspiration and expiration; this may be from five to ten millimetres Hg. Such a difference,



rapidly produced and constantly repeated, must have a considerable dilating influence upon an artery so distensible as the pulmonary, whose capacity, according to Roy, is increased twelve times by raising the pressure from 0 to 36 millimetres Hg.

As a negative proof of this contention let me draw your attention to a case where a debilitated subject was carefully guarded from all these sudden exertions, and where the heart failed, it is true, but failed in a very different manner from that which I have been describing.

Case 31.—The patient was a married woman, aged 36 years. She was never very strong; during the last week she had not been as well as usual. She was admitted into hospital immediately after a large hæmatemesis—more than one pint. There were no murmurs on admission; the pulse was hæmorrhagic with occasional dropped beats. Examination of the blood on admission revealed red corpuscles, 1,500,000; hæmoglobin, 25 per cent., and white cells, 15,000. One month later, with the patient still lying in bed in the hospital, there was no pulmonary murmur, but both a mitral murmur and a tricuspid murmur. The apex beat reached the fourth space just within the left vertical nipple line. There was retical dullness at the middle of the third space and right dullness half an inch to the right of the right edge of the sternum. This was a very different outline from that which I have described to you as occurring in debility. The blood-though count was still poor—viz., red corpuscles, 1,600,000; white corpuscles, 12,000; hæmoglobin, 30 per cent. Here the heart had started in the debility arising from a severe hæmorrhage in a weak subject, but no part of it had been subjected to more strain than the rest. The patient had been kept in bed for a few days more from all domestic work. Her food and exercise was in the smallest possible amount and what she could do to date is only as she pleased. Hence been, as it were, a general atrophy, allowing leakage through the mitral and tricuspid valves. If she had been up and about, a few days more, with her maternal and

housewifely duties I have no doubt in my own mind that her cardiac outline would have been typical to a marked degree of that characteristic of debility, whilst a pulmonary murmur would not only have been present, but would have been the chief of the three ; but, as it was, the heart gave no evidence at all of any special enlargement of the conus or of a pulmonary murmur.

Such cases as this, as well as those previously mentioned which showed no pulmonary murmur, though not seldom a mitral as long as the ill-nourished frame was kept at rest in bed, but in which one often arose when the patient was allowed to be up,—such cases seem to me to be exceedingly strong evidence in favour of the view that it is sudden sharp exertion which produces the peculiar localised failure of conus and pulmonary artery.

It is, of course, quite common for hearts of debilitated subjects who are leading an active life to give way altogether and allow tricuspid and mitral leakage, but when they do they never fail to show the large increase in the vertical dulness which is absent in the case just described ; the general giving way is an addition to the special and initial failure ; the vertical dulness remains raised, but the right and left dulnesses become increased also.

If, as I have tried to show, the right ventricle should be the first to yield, it is not difficult to understand what part of it should first give way.

We may consider the whole ventricle as one half of a cone which has been bisected from apex to base (Fig. 12) ; the stout septum ventriculorum forms the triangular surface of section, and as the left ventricle does not fail, no more will this septum ; hence we may look upon the ventricle as a triangular board to which is attached a semicircular convexity of rubber ; it is evident that this yielding rubber will stretch most where it is least restrained by the rigid triangle\*—viz, along the semicircular border of its base. Also that the portion of this border which

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\* This helps also to show why the enlargement of the right ventricle in mitral disease assumes a different form, for in this case the septum has already become itself stretched along with the rest of the left ventricle.

will stretch most will be the conus, for the lowest part is held in check by the unyielding, rigidly fixed inferior vena cava and the middle portion by the chordæ tendinæ of the tricuspid valve

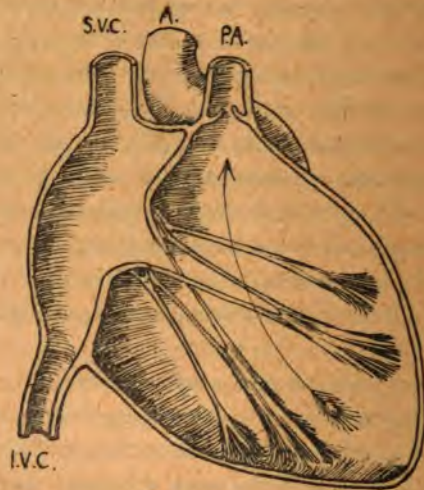


FIG. 12.

and their stout musculi. Further, the direction of the blood-current is from the apex towards the pulmonary valves; the conus will tend to give, therefore, most in the direction where it is longest distended with blood.

Given this dilatation of the conus that of the pulmonary artery is easily explained. The dilating conus carries the valves upwards and thus shortens the length between the two extremities of the artery. The artery becomes lax, and when distended with blood enlarges in its transverse diameter, so that its wall may occupy the same superficial area. Finally, we must remember the easy distensibility of the pulmonary artery, which is proportionately, after due allowance is made for the different tensions at which they work, some six times that of the aorta.

I have forborne all reference to authorities. I trust that this will not be put down to any lack of respect to other workers in the same field of inquiry. It is simply because I found them to be so many and so important that if I had once begun to quote

and, necessarily, often to combat others' views, there would have been no time left to place my own before you.

I have finished, and if these views do not commend themselves to your judgment believe that this want of conviction is due to my feebleness of exposition and not to their lack of truth. But at least I trust that this lecture will give some impetus to the study of this common and important cardiac condition, and that we shall not rest till not only this but all allied functional cardiac states are settled to our individual satisfaction and our text-books speak with no uncertain sound both of their phenomena and clinical importance. For myself I trust in subsequent papers to still further elucidate such matters as are germane to the discourse which it has been my high privilege to deliver this afternoon.

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### THE USE OF ELECTRIC MAINS FOR MEDICAL PURPOSES.\*

BY J. ALFRED CODD, M.D., B.SC. LOND.,

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THE introduction of the Dynamo-Electric Generator has made the general and economical use of electricity for commercial purposes practicable.

When it was necessary for lighting purposes to have enormous batteries of Bunsen's or Groves' elements, with the frequent polarizing and destruction of positive plates, the cost was too great for the light to be popular. Even with private instalations supplied by dynamos, unless the lighting required was extensive, it did not pay, but with the introduction of the co-operative principle, and the supply of current by a central authority along street mains for the use of a large number of consumers, the

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\* A Paper read at the Staffordshire Branch of the British Medical Association.



electro energy can be obtained at a cost incomparably less than that obtained from batteries. In the practice of a medical man using the constant current frequently, the cost of wear and tear of batteries is considerable. In the adaptation of currents of 100 volts or more for medical purposes there is always waste of energy, but the total cost of what is used and wasted is much less than the cost of positive plate and electrolyte that would have been used in a battery giving the same current.

The convenience too is much greater. Batteries *will* require attention and are frequently getting out of order. Many users of electric light would never have adopted it had they to depend on batteries and their vagaries. The turning of a switch ensures an immediate supply of current of standard E.M.F. and as many of us have currents flowing at our doors, in many cases it might be better to introduce it to the consulting room than to depend upon cumbrous and unstable batteries.

I propose in the following remarks to confine my attention almost entirely to the Constant current, since it is of this form of supply only that I have had practical experience, and it is I believe the form almost universally adopted or proposed to be adopted in the Midlands.

It is necessary to preface my remarks by a consideration of the various uses to which the current is put in medical or surgical work, and the amount of current and E.M.F. required for each purpose. If two of the factors are known the third can easily be calculated by Ohm's law.

For *Galvanization* a current of from one to twenty milliamperes is required. As the skin offers a resistance of 1000 ohms or more, it will readily be seen that the E.M.F. must be 1 to 20 volts, or more if the resistance be higher.

For *Cataphoresis* a similar current and E.M.F. are necessary.

For *Electrolysis* a current of from 5 to 200 m. amp. is required. As the electrodes are applied beneath the skin, or upon mucous membrane, or over very large surfaces, the resistance is reduced to about 220, and so the E.M.F. must be about 1 to 50.

For the *Induced Current* the use of the Induction coil is

necessary with the constant current supply, the E.M.F. required being about 1-3 volts, the current strength being immaterial owing to the shortness of the flow. With the alternating current a suitable sinusoidal current for application to the body can be obtained by means of a transformer.

For *Galvano-cautery* the current must be 10-15 ampères, but as the resistance is only about '02 ohms an E.M.F. of 4 volts is ample, but if produced by cells the cells must be large and only have an internal resistance of about '03 ohms each.

*Surgical Lamps* are generally about 1 C.P., and therefore require 4 watts. Thus the formula  $C \times E = 4$  enables you to ascertain how much current a lamp of given E.M.F. requires. Thus a 10 volt lamp requires '4 ampère, a 6 volt lamp about '7 amp., a 4 volt lamp about 1 amp.

For *Radiography* a large current is necessary up to 20 ampères, and at least 10 volts, so that by reducing E.M.F. by Rheostat, and using a Rhumkoff coil you get an arrangement far more convenient than a battery.

We have now to consider how these results may be obtained from the street mains supply. In the following paragraphs the figures are to be understood to apply to 100 volt supply, but the figures can be applied *mutatis mutandis* to any other voltage.

For *Galvanization*, *Cataphoresis* and *Electrolysis*, there are three methods available.

(i) Interposing a resistance to bring down the current. For this it would be necessary to have a resistance of 400,000 ohms which could be reduced to 4000 giving a range of current through the body of '25—20 m. ampères. It is better to have a fixed resistance of 4000 ohms, and an adjustable one from 4000 to 400,000.

(ii) Interposing a rheostat and tapping off from it a shunt circuit that passes through the body. The main circuit passes through the whole rheostat, while the shunt branches off from it wherever the sliding spring happens to be, passes through the patient's body and unites with the main circuit after it has left



the rheostat. By this means the E.M.F. (Fig. 1) may be reduced to 0.1 volt and can be increased gradually by moving the sliding spring of the rheostat without jumps to 70 volts. In this way the current can be regulated more gradually and delicately than is possible even with the best current collector or of an ordinary battery.

In both these methods it is necessary to insert a Safety Resistance to protect the patient from an overdose in case the current should be switched on when the sliding spring of rheostat was at the wrong end. This generally takes the form of a lamp. An 8 C.P. lamp has a resistance of 385 ohms and with it in series the total current cannot exceed 260 m. ampères. A 16 C.P. lamp has about half that resistance. The safety resistance also prevents rheostat and galvanometer getting burnt up, if the connecting cord should touch.

(iii) Charging a battery of about 20 small accumulators (such as the Lithamode testing cells).

In the first arrangement, even with a very small current that would not be felt if produced by batteries, there is felt a burning sensation, possibly caused by the interruptions at the commutator of the dynamo, but with the shunt rheostat (which we owe to Mr. Schall, and which he appropriately styles a volt regulator) he has shown that this burning sensation is not experienced under such conditions, while the latter is cheaper than the "series" rheostat.

The rheostat has the advantage over the accumulators in that the current is always ready, there is never any charging to do, the switchboard can be readily carried about to patients' houses wherever there is current laid on, and can be used anywhere where there is an adjacent lamp socket. The accumulator however can be carried, with some difficulty truly, to patients who have no electric light. I have adopted the shunt rheostat system. The rheostat is made of fine covered wire wound on a slate base with the front surface of the coil exposed and polished. The common current has in its course a switch, a cut out, and the safety resistance lamp. The shunt circuit contains a

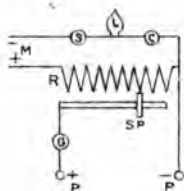


FIG. 1.—Diagram of Shunt Rheostat Switchboard. M, Wires from the main. R, Rheostat. SP, Sliding collecting spring of Rheostat. G, Galvanometer. P, P, Terminals for wires going to patient. C, Cut out. L, Safety resistance lamp. S, Switch. For the sake of simplicity the commutator has been left out.

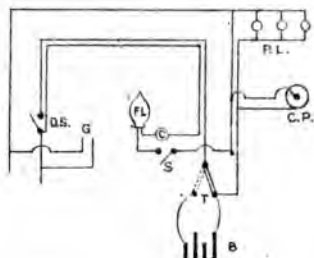


FIG. 2.—Diagram of wiring for Consulting Room. D.S., Door Switch. P.L., Pendants or fixed lights. C.P., Concentric plug for standard lamp. F.L., Focus lamp. C., S., Cut out and Switch for ditto. T, Turnover switch. B, Accumulators. G, Socket for galvanization switchboard plug.

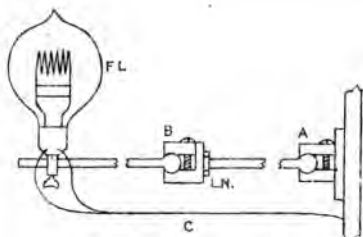


FIG. 3.—Bracket used by the author F.L., Focus lamp. L.N., Lock nut. A, First universal joint. B, Second universal joint. C, Flexible cord carrying current to lamp.



galvanometer and a de Watville reverser. A galvanometer is absolutely necessary. The number of cells in a battery gives some indication of what current is flowing, although an imperfect and unreliable one, but here there is no indication. I have used an Edelmann's galvanometer which gives readings in milliampères from 1 to 25, and by means of a shunt gives every 10 m.amp. from 10 to 250. As however it is directed by terrestrial magnetism it becomes affected by the lines of force produced by lighting currents. But recently D'Arsonval's galvanometers have been introduced, which are independent of the earth's magnetism and not affected by lighting currents, and these will probably to a large extent replace Edelmann's on switchboards.

I use a lamp socket plug, so that it can be fitted on to any lamp socket at a patient's house or elsewhere. Both plug and socket must be marked with a + sign after the pole has been tested, and each new lamp socket must have the polarity of its conductors tested. A piece of moistened neutral litmus paper is the best for the purpose. The spot in contact with the anode becomes red, that at the kathode blue. Red litmus also shows the kathode, and blue the anode by the change of colour.

For Faradism the use of the mains is not recommended, one or two dry cells are more convenient. But a transformed alternating current gives very good results.

For a constant current bath the bath must be well insulated and a rheostat must be placed on each pole, owing to the inevitable leakage from the mains or "earth," as it is technically called, from which it is necessary to protect the patient.

For *Electrolysis* with 100 or more m. amp., it is well to ascertain at the central station whether there is any chance at a given time of the current being cut off, as a sudden break would give a serious shock when a heavy current was flowing.

For *Galvano-cautery*, if the main current is used there is heavy sparking at the switch, which is usually in the handle, and it would soon be burnt away. If the platinum loop were to break or fuse, an arc would form which would cause unpleasant results

if it were being applied at the time. Therefore, a shunt resistance is necessary, which is very bulky and costly. It also requires that the mains shall be larger than usual. The better way is to charge accumulators from the main. For this purpose a two-celled 18-24 ampère-hour battery is necessary. This can be charged through a lamp, or a set of lamps in parallel so that the current has an E.M.F. of 4 volts. It is necessary that the cells should be large, otherwise the large current that is taken out will cause the plates to buckle, and the higher sulphates of lead to form, destroying the battery.

For surgical lamps, the galvanizing switchboard may be used, but the galvanometer must be cut out and a 25 C.P. lamp put in place of the higher resistance, 16 or 8 C.P. one.

This puts rather a strain on the fine wire rheostat, and if continued for long might cause considerable heating. Ideally another rheostat should be used with coarser wire, but I have used my galvanization switchboard in this way without serious results.

Another method is to charge accumulators. For an 8-volt lamp, cells of about half the size required for cautery are needed, but four of them are necessary and there are many devices for connecting up the four cells in series for lamp, and two pairs in parallel arranged in series for cautery. This forms a useful combination, but if one possesses the galvanization switchboard this will suffice for a surgical lamp of any E.M.F., while the cheaper two-celled battery is available for cautery. Also a 4-volt lamp gives a very good light and can be used with the two celled battery, but as it requires more current it gives more heat and is not so suited for the cystoscope, urethroscope, and similar instruments, to be used in contiguity with mucous surfaces as the 8-volt lamp.

For charging accumulators a current of similar E.M.F. to what is required to be given out is used. In a 4-volt battery the charging E.M.F. must be 4 volts. For this purpose a resistance must be introduced, and to this end lamps arranged in parallel are most convenient, especially as they are lighting

your room while they are charging the cells. For a 4-volt battery with 110 volts, you use one 75 C.P. or two 32 C.P., or four 16 C.P. lamps. With 220 volts double the number of lamps are necessary, and with Wenhelt's electrolytic interrupter, which gives the best results for screen work, 24 to 100 volts are required. (Fig. 2).

Another purpose for which the current is very useful is for use with the laryngoscope, otoscope, etc. The ordinary Swan filament does not answer this purpose, it is too diffuse, and gives an image of the filament. But a most excellent instrument is the focus lamp. Here the filament is a closely-packed zigzag or grid in the centre of the lamp, and they can be obtained from 25-100 C.P. I use a 50 C.P., and it gives an intense light limited to an area of less than  $\frac{3}{4}$  inch square. The flat of the filament grid should be used. This when reflected on to the palate forms an image that just fills the full-sized laryngoscope mirror. When you remember that a fully incandescent Welsbach mantle gives out 50 C.P. and compare the area of surface presented by the mantle to that of the focus lamp, the greater concentration of the latter becomes at once obvious; and we never get mantles fully incandescent with Wolverhampton gas pressure! There is no need to say that no forehead lamps with their 1 C.P. can compete with this. A condenser increases the intensity of the pencil received on the forehead mirror, but not to the same extent as with a gas or oil flame. If used it should consist of a double convex and a plano-convex lens. The bullseye alone shows an image of the filament. Focus lamps can now be obtained clear on one side and frosted on the other, and the latter side with the mitigated light can be used for ophthalmoscopic purposes. By using the edge of the grid one gets a most excellent microscope lamp for critical illumination.

The most perfect bracket is McDonald's, which is similar to Mackenzie's, with a gimble added in which the condenser chimney holding the lamp swings. It is however costly, and I have used and advocate the following device. Procure two simple ball and socket shop-fittings with loose lamp holders

such as can be procured from any electric-light fittings dealer for a very small cost, tap the end of the rod of one and the centre of the butt end of the other. (Fig. 2). Screw a nut on the rod, then screw the latter tightly into the butt end and lock it with the nut. Saw off the flanges of the second butt-end, attach the lamp holder to the far end of the second rod. By this means a very efficient universal bracket of wide amplitude can be made.

I believe the 50 C.P. lamp without condenser is quite equal to 32 C.P. lamp with one and is incomparably cheaper. It can of course be used at a patient's house where a current is laid on, and a standard lamp-stand answers very well, but the current must have the same E.M.F. I once took my focus lamp to a patient's house to examine a larynx, but found that the installation was a private one at 60 volts, and my 50 C.P. lamp only gave a faint glow. If it had been 220 volts, on the other hand, it would have burnt up the lamp.

The accompanying diagram illustrates the wiring suggested for a consulting room. There is a pendant (say a three-light fitting) the current to which is turned on by a switch at the door, and a concentric plug for a stand lamp, which can be used independently of the pendant. While the turn-over switch points to the right the current flows through pendant and stand lamp (their proper switches being on). (Fig. 3). When it points to the left, the accumulator (for cautery, for cautery and light, or for galvanization, as the case may be) is included in the circuit, and if the appropriate lamps are used, it can be charged at an appropriate E. M. F. in this way. The light given out while charging is only slightly less than that evolved by the same lamps on simple circuit.

A focus lamp is included, governed by an independent switch, also a socket to receive the plug of the galvanization switch-board. This is a simplified modification of the wiring I designed for my consulting room.

The most economical use of the constant current is obtained by motor transformers, but the initial cost of these instruments is such as to obviate the economy of their use.



A few words may here be said about the alternating current. To use it for medical purposes a transformer is necessary. This is practically an inversed induction coil. The current is run into a long coil of fine wire, and short coils of thick wire are wound round the former their length and thickness determining the E. M. F. and current strength respectively of the induced current. By winding three such secondary coils of suitable length and thickness, currents may be obtainable for light, cautery, and Faradisation. The sinusoidal current thus obtained produces a much more regular tracing than that from ordinary induction coils worked by a spring interruptor. They are much pleasanter and greater strengths can be borne with comfort.

For Galvanization, Electrolysis, and Cataphoresis, also for actuating spark coils for Röntgen rays the alternating current cannot be used.

It only requires a limited use of both methods to carry conviction as to the greater advantage of the use of the lighting mains where they can be so employed for medical purposes.

I am indebted to Dr. Lewis Jones' excellent Manual on Medical Electricity and also to Mr. Schall's concise description of Electro-Medical Instruments, both of which works might advisedly be consulted by intending purchasers of apparatus.

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## REPORTS OF SOCIETIES.

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### BRITISH MEDICAL ASSOCIATION.

#### BIRMINGHAM AND MIDLAND COUNTIES BRANCH.

Thursday, November 9th, 1899. The President, Mr. BENNETT MAY, in the Chair.

Dr. Carter read a note on a Red Pigmentation of the Face simulating the presence of blood.

Dr. Thomas Wilson read a paper on Backward Displacement of the Uterus, based on notes of 276 cases.

Dr. McDonald read a note on the diagnostic value of Simple Estimation of the Hæmic Leucocytes in obscure suppuration.

*Very large Synovial fringe removed from the knee joint.*—Mr. Barling showed this specimen from a woman, aged 39, who was the subject of rheumatoid arthritis in knees and elbows. The body removed had been growing in the left knee for about two years and had been associated with pain in the joint and frequent recurrence of synovitis. It had steadily increased in size until it had reached the size of a small hen egg at the time of operation.

The body was freely movable except at a small part of its surface and doubt was felt as to whether it was an overgrown synovial fringe or some form of new growth. On incising the joint a large quantity of fluid escaped, the synovial membrane was found very vascular with much velvety thickening, whilst the movable body was found to be attached by a broad pedicle at the inner and upper side of the joint. The pedicle was divided and some small vessels in it ligatured and the knee joint was closed in the usual way. Microscopic examination of the removed body showed it to be a fibrinous mass undergoing organisation, and in the centre there was a small caseous focus, but neither bone nor cartilage was detected. The vessels in parts showed marked Enderteritis Obliterans. There was no evidence of tubercle.

*Pedunculated adenoma removed from the sigmoid flexure.*—Mr. Barling showed this specimen nearly as large as the fist removed from a male aged 54, who had probably suffered from it for twenty years. From time to time there had been loss of blood with passage of mucus and too frequent action of bowels up to five or six times a day. Occasionally the distal portions of the growth came down to the anus and fragments of it were broken off. As it was found impossible to reach the base of the growth through the anus, the posterior wall of the rectum was divided back to the coccyx. Space was thus obtained through which the

hand and forearm could be introduced when the growth was found attached by a broad pedicle to the posterior wall of the bowel about the position of the lower part of the sigmoid flexure. Even with this access it was found impossible to secure the pedicle by ligature, a powerful pair of clamp forceps was therefore guided by the left hand around the pedicle and the growth cut away with scissors.

Uninterrupted recovery followed with complete anal control.

*Excision of the Cæcum.*—Mr. George Heaton showed a patient whose cæcum he had excised for carcinoma some two months ago, and the portions of intestine removed.

The cæcum, vermiform appendix, three inches of the ascending colon, and three inches of the ileum were resected. The lower end of the ascending colon was closed by interrupted sutures; and the cut end of the small intestine was united laterally to the ascending colon by means of a Murphy button. The patient made a rapid recovery, and has since the operation gained more than two stone in weight. The specimen showed a large cylindrical-celled carcinoma which almost completely filled the cavity of the cæcum and was invading the ascending colon.

*Pulmonary Hypertrophic Osteo-Arthropathy.*—Mr. Blaker showed a patient, aged 73, by occupation a baker, exhibiting the following well-marked symptoms.

Hypertrophy of the Lower Ends of the Radius and Ulna. Enlargement of the meta-carpal bones. Great hypertrophy of the fingers, with marked hyper-extension of the last phalanx of the fingers. The balls of the fingers resemble the clapper of a bell quite different to the grape-shaped finger-end of phthisis, or the club-shaped finger-end of heart disease. The nails are long, larger, and watch-glass shaped, tending to cap the tops of the fingers; they are striated in their length, and are very brittle. There is extreme weakness in the hands, and some slight loss of sensation. There is some œdema of the limbs from the centre of the forearm to the tips of the fingers, which conceals somewhat the deformity of the bones.

The enlargements in the lower limbs are similar. The great toe being more markedly affected. The Tarso-metatarsal region is relatively free. The malleolar lesions are very marked, the maximum increase being in the bi-malleolar diameter. The clavicles are thickened, particularly the acromial end. The acromion process of the scapula is also thickened. The iliac crests are thickened, and there is enlargement of the ends of the ribs, also hypertrophy of the sternum. There is a very pronounced curvature of the spine situated in the inferior dorsal and upper lumbar region. There is tumefaction of the elbow and knee joints, but the reflexes are present though slight. There is a thickening of the alveolar border of the superior maxillary bone, but a complete absence of disease in the lower jaw and the bones of the head.

*Urine.*—A trace of albumen and phosphates are present from time to time.

*Sputum.*—A large amount of mucus present. Complete absence of pus and tubercle bacilli and no cancer cells.

*Carcinoma of the Sigmoid.*—Mr. Haslam showed a specimen from a female aged 84, who was admitted with acute intestinal obstruction. The growth was small, and though blocking the lumen of the gut was not evident from without. It was impossible to ascertain the exact cause of the obstruction at the time of operation owing to the great distension of the intestines.

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PATHOLOGICAL AND CLINICAL SECTION.

Friday, October 27th, 1899, Mr. HENRY EALES, President in the Chair.

*Orbital Tumour.*—Mr. Eales showed a girl, aged 12 years, with a Tumour of the Orbit. She first came under his notice in February 1898, with a tumour over the site of the left lachrymal gland, which from the history had developed chiefly during the previous six months, though there was some swelling for two years previously. This tumour was removed by an incision through the skin under the eyebrow at the outer third, and was



found encapsuled, but extending far back into the orbit. Microscopical examination showed it to be an adenoma probably commencing in the lachrymal gland. In February 1899, a recurrence of the growth superficially under the middle of the eyebrow was easily removed by a skin incision and proved microscopically identical with the original growth.

Since that date a recurrence had occurred in the orbit, causing proptosis, all the eye movements were good  $V = \frac{2}{3}$ . The optic disc appeared normal, and the F.V. was full. Under these circumstances, in view of the simple nature, apparently of the tumour, Mr. Eales hesitated to clear the orbit of its contents, the only procedure likely to be effectual, so long as the eye and its appendages were intact and vision good.

*Syringo-myelia.*—Dr. Short showed a case of Syringo-myelia. The patient was a single woman aged 41, who exhibited the characteristic atrophy of the small muscles of both hands associated with spastic weakness of the legs. There was also some atrophy of the right shoulder muscle. The tactile sense was perfect all over the body with loss of perception to heat and cold. Analgesia was present to a variable extent all over the body with the exception of the face and front part of the scalp. Her taste was deficient but not lost. She suffered periodically from profuse sweating. Nystagmus was present, but the vision was good. Her field of vision to white was normal, to red much contracted, while to green it was so small as to be practically within the  $10^\circ$  degree circle of the perimeter chart.

*Ethmoidal Mucocoele.*—Mr. Jameson Evans showed a girl, æt. 22, who was suffering from an orbital tumor, hard in consistence except at one spot where it was distinctly elastic on moderate pressure. It occupied the inner angle of the left orbit and caused a displacement of the eyeball downwards and inwards with marked proptosis. The latter had been noticed for about a year. For the last few months she had suffered from constant headache and periodical attacks of swelling of the nose with some epiphora. She had however never suffered from any nasal discharge, and there was nothing abnormal to see on

making a rhinoscopic examination. The lachrymal sac and duct were unaffected. She was occasionally troubled with diplopia which was apparently worse when she looked to the left. The field of vision was full and the visual acuity was as good as it ever had been. The case was thought to be one of distension of the ethmoidal cells.

*Series of Testicles.*—Mr Jordan Lloyd showed a collection of Testes recently removed by operation for various reasons, and illustrating several interesting points in testicular pathology.

1. Sarcoma following injury, from a patient aged 24.
2. Carcinoma attacking a testicle which two years previously had been affected with tertiary syphilis, from a patient aged 44.
3. Sarcoma of purely spontaneous origin, from a patient aged 38.
4. Primary tubercle of the epididymis, with a perfectly normal testis of the one side, with primary tubercle of the epididymis and secondary tubercle of the testis of the other side, from a patient 38 years of age.
5. Primary tubercle of the testis, from a man aged 34.
6. Gummata of the testis, from a patient aged 41.
7. Cystic sarcoma of the testis, from a patient aged 28 years, of two years duration.
8. Multiple hydrocele of the epididymis, from a man aged 62.

In all the cases incision had been limited to the inguinal region or upper part of the scrotum, and the vessels of the cords had been tied separately instead of *en bloc*. All had made rapid recoveries.

*Sarcoma of Lungs.*—Dr. Douglas Stanley showed the lungs from a case of double Pneumothorax occurring in a child aged 10. The patient had had the left leg removed for sarcoma below the knee. About a year after there was loss of weight; sudden dyspnoea developed and the child was admitted to hospital, but died soon after. On *post mortem* examination both pleural cavities contained air and the lungs were the seat of extensive growths of a sarcomatous character.

## MIDLAND MEDICAL SOCIETY.

The Annual Meeting of the Society was held in Birmingham on Wednesday, October 11th, the President, Dr. W. G. Lowe, being in the chair. The following officers were elected for the ensuing session:—President, Dr. Rickards; Treasurer, Mr. John Garner; Secretaries, Dr. O. J. Kauffmann and Mr. Christopher Martin; Members of Council, Mr. T. F. Chavasse, Mr. Jordan Lloyd, Mr. J. W. Taylor, and Mr. Bennett May. The following new members were elected:—Professor R. F. C. Leith, Mr. W. W. Pitchford, and Mr. Kirkby Thomas.

On the motion of the President, a resolution expressing sympathy with Mrs. Lawson Tait in her bereavement was passed unanimously.

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The First Ordinary Meeting was held on Wednesday, October 11th, at the conclusion of the Annual Meeting, the President, Dr. RICKARDS, being in the chair.

Dr. Kauffmann showed a case of Scleroderma. The patient was a man, aged 33, but looking younger. He was a painter by occupation, but had never suffered from any symptoms of plumbism. Both gums presented well marked lead lines. The scleroderma appeared about six months before, without any assignable cause, as a solitary raised slight red patch on the inside of the left thigh, neither red nor tender, according to the patient's recollection. This patch had now extended so that the scleroderma occupied the whole of the front of the left thigh and leg, running down along the dorsum of the foot in a narrow band from the ankle to the cleft between the great and second toes. The posterior surface of the limb was quite free, and an oval patch of healthy skin extended broadly over the front of the knee joint. Two small patches were present on the abdomen, unnoticed by the patient, both on the left side. The state of the skin was that usual in scleroderma. There was neither anæsthesia nor pain; the sebaceous secretion appeared absent, and hairs were very scarce in the sclerosed area, though plentiful

on the opposite limb. The general health had not suffered in any way, and there was no mental depression, Dr. Kauffmann drew attention to the fact of this man's occupation. The only other case of extensive scleroderma which he had seen in Birmingham likewise occurred in a painter.

Mr. Hall Edwards read a paper "On some Advances in the Application of the X Rays to Medicine and Surgery, with some Notes on their Therapeutic Value." The paper was illustrated by an exhibition of apparatus, including range finders, Wehnelt interruptors, etc., and a patient was shown in whom after long exposure to the rays a large patch of lupus had sloughed.

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The Inaugural Meeting was held at the Great Western Hotel on the evening of Thursday, October 19th. The President, Dr. Rickards, held a reception at which over 130 members were present. Sir Richard Douglas Powell, M.D., F.R.C.P., then delivered an address entitled "Some remarks on the Treatment of Consumption."

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The Second Ordinary Meeting of this Society was held in the Medical Institute, Birmingham, on Wednesday, November 1st, 1899. The President, Dr. RICKARDS, was in the Chair. The following gentlemen were elected members of the Society:—Messrs. T. H. Wilkins, Leonard Boyer, E. S. Gorman, W. Billington, J. F. Atkins, M. J. Wakefield, and J. W. Turner.

Mr. Gamgee showed a boy aged six years, who, three years ago, had suffered from severe Cancrum Oris of the right side of the face, resulting in complete fixation of the right temporal maxillary joint by firm cicatricial tissue. To remedy the condition a portion of the lower jaw in front of the cicatricial mass was excised and a false joint made. The result has been quite satisfactory, the boy being now able to separate the front teeth to the extent of  $1\frac{1}{4}$  inch.

Mr. Jordan Lloyd showed a large Osteo-chondrosarcoma of the Pubes, removed from a man nearly 40 years of age, whose

father underwent amputation at the hip-joint some thirty years ago for a similar tumour in connection with the femur. The growth completely filled the pelvic cavity, compressing the urethra to such an extent as to interfere with micturition, a chronic cystitis resulting. The part of the tumour outside the pelvis was larger than an adult head, and extended nearly half way down the thigh. The operation was resorted to for the sake of relieving the cystitis, and the man's general condition at the time was very unsatisfactory from pyæmia and urotoxæmia. The whole tumour was removed by morcellement and without injury to the pelvic viscera and with the loss of only a few ounces of blood. The patient rallied easily from shock and died somewhat unexpectedly the following morning from asthenia.

Dr. Douglas Stanley showed the fibia and tibia from a case of joint disease due to tabes. There was marked new formation of bone at the lower end, and also an increased porosity. A cast was also shown taken from the right knee of a man aged fifty-nine who was the subject of tabes. When about twelve years of age he had sustained a severe injury to the knee, as the result of which it became ankylosed. When he came under observation in February, 1899, the injured knee showed "charcotic" changes in process.

Mr. Barling read a paper entitled "Appendicitis: a Review of one hundred and seventeen cases of operation."

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The Third Ordinary Meeting was held at the Medical Institute, on Wednesday, November 15th, 1899, Mr. HENRY EALES being in the Chair. The following gentlemen were elected members of the Society:—Messrs. H. E. Urring, S. Southall and J. T. Harvey.

Dr. Malins showed two cases of Vaginal Hysterectomy. 1. In this case the pregnant uterus was removed for carcinoma, the patient was aged 40, and had seven or more but no miscarriages. Her labours had been difficult, the 1st being in August, 1897.

Her illness dated from that time. She complained of pains in the back and lower abdomen, irregular menstrual discharge with occasional flooding. On admission, October 13th, a mass was found on the anterior lip of the cervix two and half inches broad, bleeding on touch and readily breaking down. The uterus was enlarged, being also the seat of a ten weeks' pregnancy. The operation of vaginal hysterectomy was performed on October 14th. The broad ligaments were clamped with forceps, ten pairs being used. To facilitate removal, the uterus was split posteriorly to within a short distance of the fundus. The forceps were removed in 48 hours. The patient made an uneventful recovery. The growth presented all the characteristics of carcinoma of the cervix.

2. In the second case, the uterus was removed for Persistent Metrorrhagia. The patient was aged 46, had had 14 children and three miscarriages. For two years she had suffered from irregular hæmorrhages with pain in the pelvis, worse on the left side, and at times very severe. She was curetted on March the 18th. She was admitted again on August the 19th, and on September the 9th, vaginal hysterectomy was performed. The broad ligaments were tied on each side with silk. The appendages were left. There was subsequently a little suppuration at the apex of the vagina, but the patient did well and left the hospital on October 25th. The uterus was large, very thick, its walls measuring fully one inch across. It was examined microscopically by Dr. MacDonald, who reported that the glands were enlarged and increased in number, the connective tissue increased in quantity. The condition was therefore one of hypertrophic glandular endometritis.

Mr. George Heaton showed three specimens of bronchocele removed during the last two months. The first specimen was the right lobe and isthmus of an enlarged thyroid removed from a woman aged 25. The specimen was a true parenchymatous bronchocele. Mr. Heaton had some years ago removed a bronchocele from her mother's neck.

The second specimen was the right lobe and isthmus of the

thyroid removed from a patient aged 34. For some time past the tumour had completely prevented her from lying down when asleep, and occasionally brought on attacks of suffocative dyspnoea. The specimen was a colloid goitre, the cells lining some of the spaces showing rapid proliferation.

The third specimen was a well marked cystic bronchocele. It consisted of the right lobe and isthmus of an enlarged thyroid removed from a woman aged 21, who had noticed an enlargement in her neck for three years which had latterly increased rapidly in size. The largest cyst in the tumour measured  $2\frac{1}{2}$  by  $1\frac{1}{2}$  inches.

All the patients made good and rapid recoveries. It is noteworthy that they all came from the neighbourhood.

Mr. Priestley Smith read a paper on "The Importance of Early Treatment in Strabismus."

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## REVIEWS.

### A SYSTEM OF MEDICINE.\*

THE last volume but one of Professor Clifford Allbutt's *System of Medicine* continues and concludes the Section on Diseases of the Nervous System. Its appearance has been awaited by neurologists with much interest owing to the large amount of new work with which it has to deal and the opportunity thus given to writers to display both originality and wide knowledge of present day work. Probably a weak volume on nervous diseases would have caused especial disappointment, but we are happy to say that with the exception of a few articles no such failure has to be recorded.

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\* *A System of Medicine* By Many Writers. Edited by Thomas Clifford Allbutt, M.A., M.D., LL.D., D.Sc., F.R.C.P., F.R.S., F.L.S., F.S.A., Regius Professor of Physic in the University of Cambridge. Volume VII. London: Macmillan and Co. Limited. 1899.

Dr. Frederick Taylor opens the volume with an account of the various forms of Myelitis, a subject on which there is but little new to say; and is followed by Dr. Andrew H. Smith, of the Presbyterian Hospital of New York, who contributes a moderately full description of the Caisson Disease—an article which, by the way, we have at least one English writer whose experience of the disorder would well have qualified him to write. After a short chapter on Hæmatomyelia by Dr. F. E. Batten, we come to the first really important article, namely, that on Disseminated Sclerosis by Dr. J. S. Risien Russell, and this, as is the case with all the articles contributed by this writer, is of high merit. We particularly welcome his displacement of the “classical” description of the early writers from the position of “type” of the disease, and his substitution of the very varying and often puzzling symptoms which are actually met with in practice. The most important part of the article on Tabes Dorsalis is that written by Dr. F. W. Mott, which deals with the new pathology of the disease. This statement, however, is in no way a disparagement of Dr. Ormerod’s share of the work.

Sir T. Grainger Stewart’s description of the various forms of Spastic Paraplegia is distinctly disappointing, for, although he gives a good account of Primary Spastic Paraplegia, the sections dealing with Ataxic Paraplegia, Pellagra, Putnam and Dana’s Sclerosis of the Lateral and Posterior Columns, Friedreich’s Ataxia, and Hereditary Cerebellar Ataxia appear to us to be altogether below the general standard of the volume. The information conveyed in most of these sections is hardly more than may be found in many text-books of medicine, whilst those dealing with the difficult and little known diseases, Pellagra and Putnam and Dana’s Sclerosis, are valueless for the purposes of reference. Dr. M. Allen Starr’s article on Syringomyelia and that by Dr. C. E. Beevor on Amyotrophic Lateral Sclerosis are in marked contrast with the foregoing, and each gives a good and full account of its subject. An interesting note on Senile Paraplegia, written by the Editor, completes this section of the book.



The Nuclear Diseases, namely Acute and Chronic Anterior Poliomyelitis and the Bulbar Palsies, form an excellent chapter. Acute Anterior Poliomyelitis is dealt with by Dr. M. Allen Starr, the best part of whose article deals with the etiology and morbid anatomy of the disease. Still better, perhaps, is Dr. C. E. Beevor's description of the various forms of Chronic Anterior Poliomyelitis and Bulbar Palsy. These articles are particularly free from the text-book style of writing which is noticeable in some hitherto described, and are evidently the outcome of a careful study of modern work.

The series of chapters on the Diseases of the Brain are preceded by two preliminary monographs on the Experimental Pathology of the Cerebral Circulation by Dr. Leonard Hill, and the Regional Diagnosis of Cerebral Disease by Dr. Ferrier. Both of these are very important articles, though we are inclined to think that the former is somewhat longer than is necessary or suitable. This, however, is the only adverse criticism that can be passed upon it. Dr. Ferrier's monograph on Regional Diagnosis must rank with those articles in the System which stand out by reason of their excellence. It also is of great length, occupying no less than 123 pages, but the importance of the subject and the character of the article itself are ample justifications. The chapter on Aphasia has been placed in the hands of Dr. Bastian, and a fine monograph is again the result. Dr. Bastian writes of course from his own well-known standpoint as to the nature and functions of the so-called cortical motor area—so-called, because in his opinion the area is a sensory one. The article of necessity follows generally the lines of the same writer's book on Aphasia, and no better course could in our opinion have been followed.

Passing over two less important articles on Impediments of Speech and Concussion of the Brain, we come to two very good chapters on Tuberculous Meningitis by Dr. Barlow, and Simple Meningitis in Children by Drs. Lees and Barlow. The latter article, dealing with a disease of which little has been known until very recent times, is a most valuable one. Dr. James

Taylor then gives a very good account of Occlusion of the Cerebral Vessels, after which comes a section on Certain Affections of the Ear by Mr. C. A. Ballance, which, though good in itself, is again, we venture to think, somewhat out of proportion in point of length.

Four very excellent articles are contributed on Cerebral Hæmorrhage by Dr. Tooth, Abscess of the Brain and Intracranial Tumours, both by Dr. Byrom Bramwell, and Intracranial Syphilis by Dr. Aldren Turner. Then follows a description of General Paralysis of the Insane by Dr. Savage, the pathological part of the article being written by Dr. Edwin Goodall. Two short articles on Infantile Cerebral Degeneration by Drs. Risien Russell and E. C. Kingdon, and the Cerebral Palsies of Children by Dr. James Taylor, finish this very fine section of the volume.

The final division, entitled "Other Diseases of the Nervous System," contains articles on Disorders of Sleep by Professor Bradbury, Epilepsy by Sir William Gowers, Puerperal Eclampsia by Dr. G. E. Herman, and Chorea by Dr. Risien Russell, together with a series of brief notes on various disorders of movement by the last-mentioned writer. Of these Dr. Risien Russell's contributions stand out with the article on Epilepsy as of especial merit. Particular attention is sure to be attracted to the series of articles mentioned above on various disorders of movement, and of these especial interest attaches to the chapter on The Tics, which contains information which will probably be somewhat new to many readers.

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#### ORTHOPÆDIC SURGERY.\*

THIS book opens with an introduction to the general pathology, principles of treatment, etc., of deformities, the various morbid

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\* *Orthopædic Surgery, a Text-Book of the Pathology and Treatment of Deformities.* By J. Jackson Clarke, M.B. Lond., F.R.C.S. With 309 illustrations. Pp. 454. London: Cassell and Company Limited. 1899.

conditions, habits, etc., producing deformities being described, *e.g.*, rickets, rheumatoid arthritis, pressure deformities and vestimentary deformities, the pathology of the several diseases being very carefully and accurately described. A chapter of this kind forms an excellent introduction to a work on orthopædic surgery; but it would, we cannot help thinking, have been better if the chapter had been limited somewhat in its scope and if the diseases described had been written about in a more uniform manner. For example, the pathology of rickets and the influence of the disease on the production of deformities are fully and most lucidly described, but nothing is said about the treatment of the disease. This is as it should be in a chapter treating of the general pathology of deformities; but a few pages further on rheumatoid arthritis is spoken of and its pathology described as carefully as that of rickets, but in this case the treatment of the disease is described. If the treatment of one is described, why not of the other? Again, if the treatment of rheumatoid arthritis is to be described in this place, let it be discussed thoroughly and not be dismissed in two pages or rather less. A useful description is given of the general prophylaxis and treatment of deformities and also of the principles of treatment by instruments. This last mentioned portion of Mr. Clarke's book is particularly valuable, and supplies an omission which we have noticed in one or two recently published books on orthopædic surgery. This section ends with an account of the most generally applicable operations for the relief of deformities, *e.g.*, tenotomy and osteotomy.

Part II. deals with special orthopædic surgery, the special deformities of the different parts of the body being taken in order. "Hallux Rigidus or Flexus" is spoken of, but it is remarked that the latter term has been objected to on the ground that the flexion constitutes but a minor part of the condition. We agree with this objection, and hence are disposed to disagree with the author's suggestion that the condition is due to flexion of the great toe by the flexor longus pollicis consequent upon slight flat foot. Attention should be called to

the author's very complete description of Dupuytren contraction, a description complete both as regards the clinical and pathological aspects of the deformity.

Phelps's operation for the treatment of talipes equino-varus is not advocated; but we notice that Mr. Clarke's opinion is based on a not very extensive experience of the operation, as he remarks that he has only performed it once. Our own experience is that Phelps's operation, in suitable cases, gives decidedly good results. We could have wished for a rather fuller account of the pathological anatomy of flat foot, but have nothing but what is favourable to say about the section on the treatment of the condition. We are glad to see that Ogston's operation is favourably spoken of.

It is impossible to discuss in detail every chapter of this book, but special attention may be called to the excellent descriptions of congenital dislocation of the hip, of coxa vara, of the various forms of wry-neck, and of scoliosis. The general impression left upon our mind after reading Mr. Jackson Clarke's book is that he has taken great pains in its preparation, that the descriptions are clear and precise, and that the book can be taken as a reliable guide to the subject of orthopædic surgery, more especially in its pathological aspect. At the same time, we cannot help feeling that the author's experience of some of the operative measures which he describes is apparently a somewhat limited one; and hence that the reader will feel the want of that most valuable form of help, namely, advice as to operative treatment based on a full personal experience on the part of the author. We must congratulate the author and publishers alike on the way in which the book is printed and on the number and excellence of the illustrations.

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### ANÆMIA AND DISEASES OF THE BLOOD FORMING GLANDS.\*

THIS book is based on the author's observation of a large number of cases extending over a considerable period, and is mainly the record of his own clinical researches. The work by no means professes to be a monograph of the anæmic diseases, but is rather a series of clinical studies on chlorosis, pernicious anæmia, leucocythæmia, Addison's disease, myxodema, acromegaly, etc., subjects which have been associated with Dr. Bramwell's name for many years. The first subject treated is chlorosis based on an analysis of 314 cases. In 72 of these there was evidence of some tubercular affection in near relatives. This point is of interest in view of the statements made by some writers. The author passes in review the various theories of the causation of chlorosis, and ends by stating that the essential cause would appear to be a deficiency of hæmoglobin in the blood—a deficiency which is produced in some way or another by the strain which is put upon the tissues and blood-forming organs of the female by the rapid development which takes place at or about the time of puberty, and especially perhaps by the unusual strain which the development and establishment of the function of menstruation entail. This it is at once evident does not apply to cases of chlorosis occurring in males or in women considerably beyond the period of development, and in the existence of such cases we strongly believe. There follows a very detailed clinical description of chlorosis. We notice that the author states that in a "small proportion of cases of chlorosis optic neuritis is present." From observations which we are at present making it would seem that the occurrence of optic neuritis is rather more frequent than has been supposed.

Pernicious anæmia is described at considerable length, being a subject which Dr. Bramwell has largely helped to elucidate.

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\* Anæmia and Disease of the Blood-Forming Glands. By Byrom Bramwell, M.D. Edin. : Oliver and Boyd.

We notice that the author is inclined to extend the term pernicious anæmia to a class of cases rather than to confine it to one particular form of anæmic disease. In this we strongly concur. It is quite probable that future observations will show the existence of "pernicious anæmias." This would include other forms which at present occupy a somewhat belated position. Under the head of Differential Diagnosis we note that the author makes no reference to cases of ulcerative colitis, which we have known to be confounded with ordinary cases of Addison's anæmia.

The chapter on Leucocythæmia is very full, and the various views as to its pathology are subjected to careful criticism. The article on Addison's Disease is interesting, and the writer takes a particularly broad view of the subject of Suprarenal Disease. We think at the same time some greater space might have been devoted to the large amount of experimental physiology of the suprarenals which has been worked out in recent years, especially by French physiologists. Myxœdema is a subject which we should expect to come in for a very considerable amount of attention at Dr. Bramwell's hands, for his extensive observations on this disease are now familiar, and his careful accounts of the disease as they appeared in the Edinburgh Hospital Reports attracted considerable attention. In the chapter on Exophthalmic Goitre there are many interesting statements as to associated conditions, but which we cannot discuss here. The writer states his belief in the nervous aspect of the pathology of Graves' disease, saying that "the primary cause is a lesion, or, rather, perhaps, a functional disturbance, in some part of the nervous system, probably in some part of the medulla oblongata." At the same time, the possibility that future observations may demonstrate the primary influence of the thyroid is admitted.

We are inclined to think that the number of records of cases is rather too large. In very many instances they suffer from a sameness which, while interesting in the wards, is apt to detract from the interest of the reader.

In conclusion, we can confidently state that Dr. Byron Bramwell's latest contribution to medical literature is a valuable one, and must take an acknowledged place among works dealing with the difficult and obscure diseases of which it treats.

DOUGLAS STANLEY

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### THE MURMURS OF MITRAL DISEASE.\*

THIS is a book of 46 pages which sets forth the author's views on the causation of murmurs in general, and of the "presystolic" in particular. He very carefully defines his terms, and his language is clear and precise.

The theory was first announced in 1897, and since then the writer has applied the leading principles to explain other murmurs, the causation and origin of which have been hitherto, and will be in the future, of considerable controversial interest.

Briefly, stress is laid on the *crescendo* and *decrescendo* characters of murmurs. The presystolic of mitral stenosis has essentially the former quality to a marked degree, and coincidentally a progressive rise in pitch. These phenomena are explained by experiments which seem to us not quite conclusive, in that the structures are represented in the apparatus by rubber and other manufactured materials, but considerable ingenuity is displayed in their employment as well as in the inferences derived therefrom.

The theory maintained is that the presystolic murmur is one of regurgitation at the extreme commencement of the ventricular systole before even the first sound is heard through the chest wall. This is feasible, for even the reserve of Professor Foster allows the possibility that the actual commencement of the audibility of the first sound may be slightly behind the actual beginning of the muscular contraction. The *crescendo* quality

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\* The Murmurs of Mitral Disease. By Ed. Mansfield Brockbank, M.D., M.R.C.P. Edinburgh and London: Young J. Pentland. 1899.

is produced by the regurgitation of blood through the rather rapidly closing and thickened mitral curtains, until they meet with a loud snap. To us this appears to be a weak point, for no value is given to the "muscular tone" factor nor to the probability that the majority of the first sound is produced in the right ventricle.

Viewing it as a whole, the author's theory seems much more rational than that usually accepted, viz., that the onrush of blood from auricle to ventricle through a narrowed auriculo-ventricular orifice is the sole cause of the presystolic murmur.

All interested in cardiac conditions will do well to peruse this thoughtful little book, the arrangement and publishing of which leave nothing to be desired.

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#### ENLARGEMENT OF THE PROSTATE; ITS TREATMENT AND RADICAL CURE.\*

It does not surprise us that a second edition of Mr. Mansell Moullin's book on enlargement of the prostate has been required, for the book is an excellent one, alike as regards the matter it contains and as regards the manner in which it is written. In the present edition the description of many operations on the prostate has been omitted, while other sections have been amplified. The chapters on treatment are naturally the most important and interesting. In the performance of McGill's operation of prostatectomy it is advised that a perineal incision should be made, both for the purpose of thorough exploration of the first part of the urethra and for subsequent efficient drainage. Stress is laid on the fact that double castration always produces diminution in the size of the prostate, but that the degree to which the symptoms are relieved is uncertain. It is stated that if all the instances in which double

\* Enlargement of the Prostate; its Treatment and Radical Cure. By C. Mansell Moullin, M.D. Oxon., F.R.C.S. Second Edition. London: H. K. Lewis. 1899.



castration for enlarged prostate has been performed could be collected together, the mortality would be as high as 15 per cent. We can unhesitatingly recommend Mr. Mansell Moullin's book.

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### HYGIENE AND PUBLIC HEALTH.\*

THIS is a further revision of Dr. Whitelegge's well-known manual which first appeared in 1890. In many ways it has been extended in scope, more especially as regards vital statistics, sewage disposal, and some other points. Chapter xii. deals with the question of specific diseases and in it are given various tables bearing on the question of smallpox as affected by vaccination. These will prove of use to many. The book is one which will eminently serve the purpose of candidates preparing for the different examinations for Diplomas in Public Health.

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### INTERNATIONAL DIRECTORY OF LARYNGOLOGISTS AND OTOLOGISTS.†

THIS little book contains the names and addresses of 1,760 specialists. The German and American lists seem to be most complete, containing as they do 714 and 462 names respectively.

The British Isles are represented by 105 names distributed as follows:—London 53; English Counties 29; Scotland 22; Ireland 1. ! Obviously a good many gaps remain to be filled up here. Berlin furnishes 101 names, and Vienna only 25; in the case of the latter city we notice several omissions.

In despite of defects, however, the book will be found extremely useful, and we have no doubt that in its second edition it will be still more so.

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\* Hygiene and Public Health. By Arthur Whitelegge, M.D. London: Cassell and Company.

† International Directory of Laryngologists and Otolologists. Compiled by Richard Lake, F.R.C.S. London: Rebrman and Co.

## EDINBURGH MEDICAL JOURNAL.\*

IN acknowledging Vol. v. of the Edinburgh Medical Journal we would call attention to some of the important contributions, which it contains. There are three articles on Typhus Fever all of considerable value and containing important information concerning the bacteriological origin of this disease, now somewhat rare. As may be supposed, opportunities for investigating Typhus are uncommon, and consequently the recent outbreak of this fever in Edinburgh was sure to offer a splendid field for research.

The important articles by Dr. Alex Morrison on the Nervous System in relation to Visceral Disease are continued. Another contribution to Neurology is Dr. Parves Stewart's paper on Chorea. Prof. William Osler has a paper on Splenic Enlargement with Recurring Gastro-Intestinal Hæmorrhages. The interesting question of the Decidual Cell is the subject of an article by Dr. W. E. Fothergill.

There are many and interesting papers on surgical and gynaecological subjects, all adding to the importance of the Edinburgh Medical Journal as a leading publication.

## AN EPITOME OF THE HISTORY OF MEDICINE.†

THIS is the second edition of Dr. Roswell Park's very interesting book on historic medicine, a book which was soon recognised as not only an important contribution to the subject, but as one possessing very considerable literary merit. In the hurry of the nineteenth century we are too apt to ignore the more placid methods of thought and observation of past generations of physicians, still more to forget that they suffered and even died in the pursuit of knowledge which we in happier days acquire perhaps too easily.

\* Edinburgh Medical Journal. Vol. v., New Series. Edinburgh: Young J. Pentland.

† An Epitome of the History of Medicine. By Roswell Park. A.M., M.D., Professor of Surgery in the Medical Department of the University of Buffalo, etc. Second Edition. Illustrated. Philadelphia. The F. A. Davis Co.

## VARIA.

THE Birmingham Medical School has been prominent at the recent M.B. examination in London. Out of six candidates five, viz., Messrs. A. S. Barnes, W. Billington, E. Collens, A. O'Dowd, and H. E. White, have all passed, the first two being in the 1st Division. Messrs. Barnes and Billington have both been elected to the posts of House Physician, Queen's Hospital.

THE Annual Students' Dinner is fixed for December 14th, under the Presidency of Mr. W. F. Haslam. We are asked to draw the attention of all old Students to the event, as it is hoped that the function may be in every way successful.

---

*PUBLISHERS' DEPARTMENT.*

---

**New Inventions, Drugs, etc.**

MESSRS. INNES, SMITH & CO. have drawn our attention to some analyses\* they have had made of their wines. Their reason in making such analyses is that there is very little exact information extant concerning the constituents other than alcohol of various wines. The subject is, without doubt, one of importance from a medical point of view. There is, we believe, a certain amount of "rule of thumb" in the ordering of wines both in illness and as a beverage. Further, it has been stated (and the analyses before us bear this out) that different brands of the same species of wine may differ very considerably in their percentage of extractives, acidity, sugar, etc. We append some of

---

\* Made by Messrs. Southall Bros. and Barclay.

the analyses referred to, as the information to be obtained from them is instructing :—

"BURGUNDY," No. 3.

|                                  | Parts per cent. |
|----------------------------------|-----------------|
| Alcohol ... ..                   | 13'18           |
| Extractive matter ... ..         | 2'95            |
| Mineral matter ... ..            | 0'30            |
| Acidity, as tartaric acid ... .. | 0'65            |
| Sugar ... ..                     | 0'36            |

The mineral matter contained magnesium, potassium, etc., with a considerable amount of iron and phosphoric acid equivalent to 0'021 per cent. of the wine.

"BURGUNDY," No. 2.

|                                                                                 | Parts per cent. |
|---------------------------------------------------------------------------------|-----------------|
| Absolute alcohol ... ..                                                         | 14'13           |
| Extractive matter ... ..                                                        | 2'76            |
| Acidity, as tartaric acid ... ..                                                | 0'67            |
| * Mineral matter, consisting of salts of<br>magnesium, calcium, potassium, etc. | 0'22            |
| Sugar ... ..                                                                    | 0'21            |

"CARLOWITZ," No. 4.

|                                  | Parts per cent. |
|----------------------------------|-----------------|
| Alcohol ... ..                   | 9'58            |
| Extractive matter ... ..         | 2'05            |
| Mineral matter ... ..            | 0'27            |
| Acidity, as tartaric acid ... .. | 0'66            |
| Sugar ... ..                     | 0'15            |

The mineral matter contained magnesium, potassium, etc., with a large trace of iron and phosphoric acid equivalent to 0'035 per cent. of the wine.

"MOSELLE," No. 6.

|                                                                                                                | Parts per cent. |
|----------------------------------------------------------------------------------------------------------------|-----------------|
| Absolute alcohol ... ..                                                                                        | 9'62            |
| Extractive matter ... ..                                                                                       | 1'95            |
| Acidity, as tartaric acid ... ..                                                                               | 0'77            |
| † Mineral matter consisting of salts of<br>magnesium, calcium, potassium, etc.,<br>with a trace of iron ... .. | 0'19            |
| Sugar ... ..                                                                                                   | 0'06            |

\* This contained phosphoric acid corresponding to 0'024 per cent. of the wine.

† These contained phosphoric acid corresponding to 0'024 per cent. of the wine.

### New Books, etc., Received.

- From Macmillan and Co.—  
 Mental Affections. By John Macpherson, M.D.  
 A Manual of Surgery. By Charles Stonham, F.R.C.S. Vols. i. & ii.
- From Charles Griffin and Co.—  
 Outlines of Bacteriology. By Drs. Thoinot and Masselin. Translated  
 by W. St. Clair Symmers, M.B.
- From John Wright and Co.—  
 Medical Annual Synoptical Index.
- From Longmans, Green and Co.—  
 A Manual of Surgical Treatment. Part ii.
- From the Scientific Press Limited—  
 Surgical Ward Work and Nursing.
- From John Bale and Sons—  
 Appendix to Medical Digest. By Richard Neale, M.D.
- From Henry Glaisher—  
 Cancer. By T. W. Nunn, F.R.C.S.
- From the F. A. Davis Co., Philadelphia—  
 Laboratory Manual of Physiological Chemistry. By Albert W.  
 Rockwood, M.D.
- From J. and A. Churchill—  
 Open Air Treatment of Consumption. By Jane Walker.  
 Effects of Borax and Boracic Acid on the Human System. By Oscar  
 Lisbreich.
- From William F. Clay, Edinburgh—  
 Clinical Studies in Vice and Insanity. By G. R. Wilson, M.D.  
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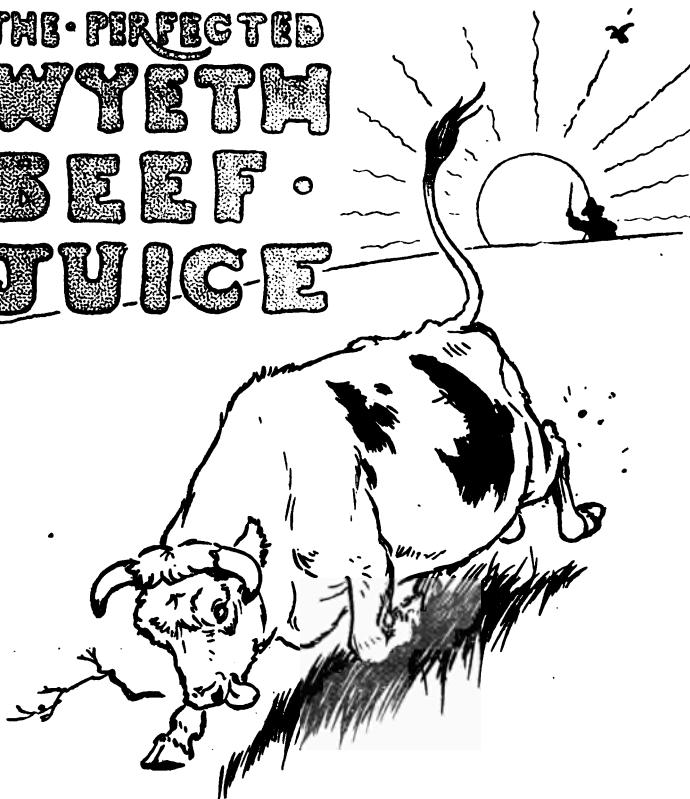
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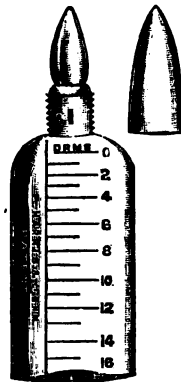
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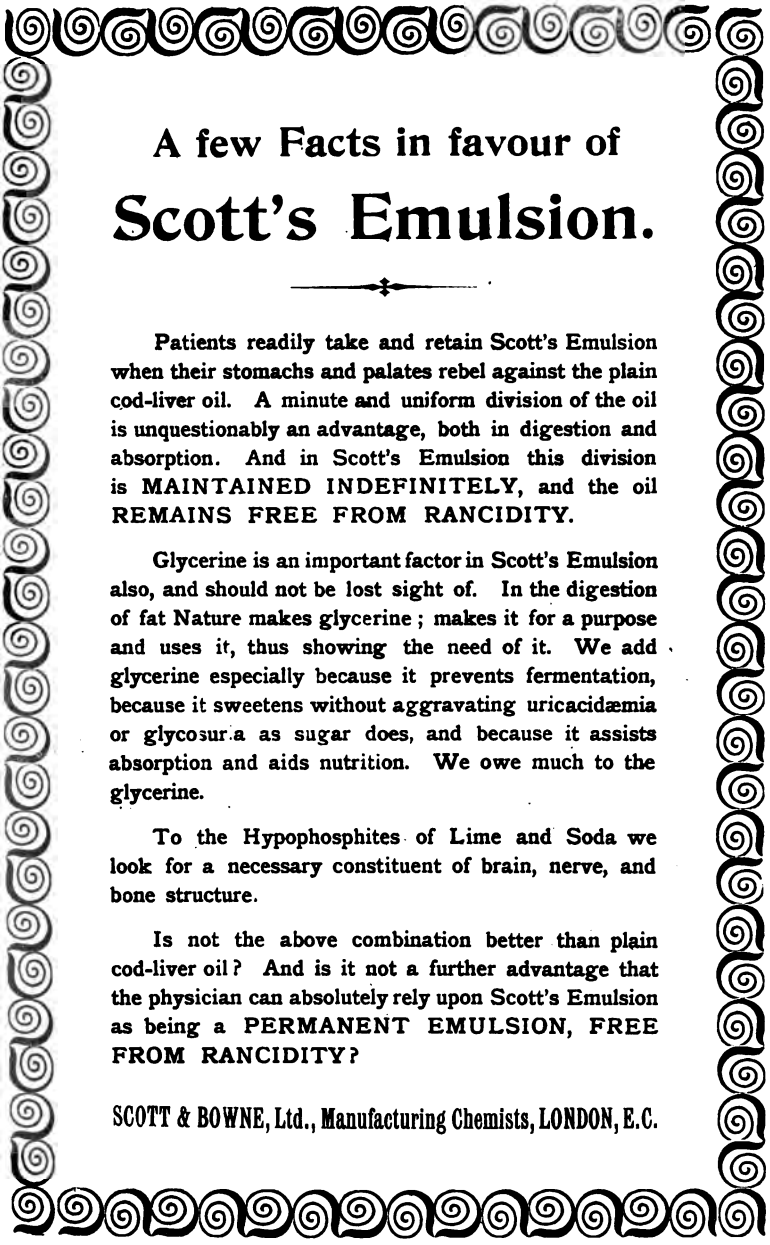
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| 22                            | 18 7 6                                         | 24 12 6                   | 27 17 6         | 33 11 8         | 22                            |
| 23                            | 18 11 8                                        | 24 15 10                  | 28 1 8          | 33 15 10        | 23                            |
| 24                            | 18 15 10                                       | 24 19 2                   | 28 5 0          | 34 0 0          | 24                            |
| 25                            | 19 0 0                                         | 25 1 8                    | 28 8 4          | 34 4 2          | 25                            |
| 26                            | 19 5 0                                         | 25 5 0                    | 28 12 6         | 34 9 2          | 26                            |
| 27                            | 19 11 8                                        | 25 10 0                   | 28 18 4         | 34 15 10        | 27                            |
| 28                            | 19 19 2                                        | 25 15 10                  | 29 4 2          | 35 3 4          | 28                            |
| 29                            | 20 6 8                                         | 26 2 8                    | 29 11 8         | 35 11 8         | 29                            |
| 30                            | 20 15 0                                        | 26 10 0                   | 29 19 2         | 36 0 10         | 30                            |
| 31                            | 21 5 0                                         | 26 17 6                   | 30 7 6          | 36 10 10        | 31                            |
| 32                            | 21 14 2                                        | 27 6 8                    | 30 17 6         | 37 1 8          | 32                            |
| 33                            | 22 5 0                                         | 27 15 10                  | 31 7 6          | 37 14 2         | 33                            |
| 34                            | 22 15 10                                       | 28 6 8                    | 31 18 4         | 38 6 8          | 34                            |
| 35                            | 23 8 4                                         | 28 17 6                   | 32 10 0         | 39 0 0          | 35                            |
| 36                            | 24 1 8                                         | 29 10 0                   | 33 2 6          | 39 15 0         | 36                            |
| 37                            | 24 16 8                                        | 30 2 6                    | 33 15 10        | 40 10 0         | 37                            |
| 38                            | 25 12 6                                        | 30 15 10                  | 34 9 2          | 41 4 2          | 38                            |
| 39                            | 26 9 2                                         | 31 10 0                   | 35 4 2          | 42 0 0          | 39                            |
| 40                            | 27 7 6                                         | 32 5 0                    | 35 19 2         | 42 16 8         | 40                            |
| 41                            | 28 6 8                                         | 33 0 10                   | 36 15 10        | 43 15 0         | 41                            |
| 42                            | 29 6 8                                         | 33 18 4                   | 37 13 4         | 44 14 2         | 42                            |
| 43                            | 30 9 2                                         | 34 16 8                   | 38 12 6         | 45 15 0         | 43                            |
| 44                            | 31 12 6                                        | 35 17 6                   | 39 13 4         | 46 16 8         | 44                            |
| 45                            | 32 17 6                                        | 37 0 0                    | 40 15 10        | 48 1 8          | 45                            |
| 46                            | 34 4 2                                         | 38 5 0                    | 42 0 10         | 49 7 6          | 46                            |
| 47                            | 35 14 2                                        | 39 11 8                   | 43 7 6          | 50 16 8         | 47                            |
| 48                            | 37 6 8                                         | 41 0 10                   | 44 17 6         | 52 8 4          | 48                            |
| 49                            | 39 0 10                                        | 42 12 6                   | 46 9 2          | 54 1 8          | 49                            |
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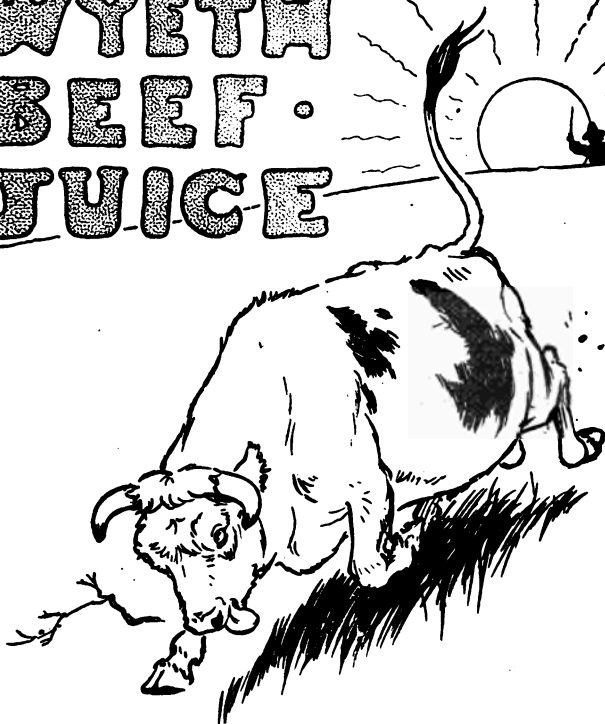
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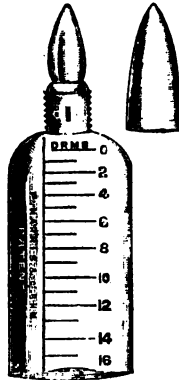
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| 26                            | 19 5 0                                         | 25 5 0                    | 28 12 6         | 34 9 2          | 26                            |
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| 28                            | 19 19 2                                        | 25 15 10                  | 29 4 2          | 35 3 4          | 28                            |
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| 30                            | 20 15 0                                        | 26 10 0                   | 29 19 2         | 36 0 10         | 30                            |
| 31                            | 21 5 0                                         | 26 17 6                   | 30 7 6          | 36 10 10        | 31                            |
| 32                            | 21 14 2                                        | 27 6 8                    | 30 17 6         | 37 1 8          | 32                            |
| 33                            | 22 5 0                                         | 27 15 10                  | 31 7 6          | 37 14 2         | 33                            |
| 34                            | 22 15 10                                       | 28 6 8                    | 31 18 4         | 38 6 8          | 34                            |
| 35                            | 23 8 4                                         | 28 17 6                   | 32 10 0         | 39 0 0          | 35                            |
| 36                            | 24 1 8                                         | 29 10 0                   | 33 2 6          | 39 15 0         | 36                            |
| 37                            | 24 16 8                                        | 30 2 6                    | 33 15 10        | 40 10 0         | 37                            |
| 38                            | 25 12 6                                        | 30 15 10                  | 34 9 2          | 41 4 2          | 38                            |
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| 23                            | 18                                             | 11 | 8  | 24                        | 15 | 10 | 28              | 1  | 8  | 33              | 15 | 10 | 23                            |
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| 26                            | 19                                             | 5  | 0  | 25                        | 5  | 0  | 28              | 12 | 6  | 34              | 9  | 2  | 26                            |
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| 35                            | 23                                             | 8  | 4  | 28                        | 17 | 6  | 32              | 10 | 0  | 39              | 0  | 0  | 35                            |
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| 37                            | 24                                             | 16 | 8  | 30                        | 2  | 6  | 33              | 15 | 10 | 40              | 10 | 0  | 37                            |
| 38                            | 25                                             | 12 | 6  | 30                        | 15 | 10 | 34              | 9  | 2  | 41              | 4  | 2  | 38                            |
| 39                            | 26                                             | 9  | 2  | 31                        | 10 | 0  | 35              | 4  | 2  | 42              | 0  | 0  | 39                            |
| 40                            | 27                                             | 7  | 6  | 32                        | 5  | 0  | 35              | 19 | 2  | 42              | 16 | 8  | 40                            |
| 41                            | 28                                             | 6  | 8  | 33                        | 0  | 10 | 36              | 15 | 10 | 43              | 15 | 0  | 41                            |
| 42                            | 29                                             | 6  | 8  | 33                        | 18 | 4  | 37              | 13 | 4  | 44              | 14 | 2  | 42                            |
| 43                            | 30                                             | 9  | 2  | 34                        | 16 | 8  | 38              | 12 | 6  | 45              | 15 | 0  | 43                            |
| 44                            | 31                                             | 12 | 6  | 35                        | 17 | 6  | 39              | 13 | 4  | 46              | 16 | 8  | 44                            |
| 45                            | 32                                             | 17 | 6  | 37                        | 0  | 0  | 40              | 15 | 10 | 48              | 1  | 8  | 45                            |
| 46                            | 34                                             | 4  | 2  | 38                        | 5  | 0  | 42              | 0  | 10 | 49              | 7  | 6  | 46                            |
| 47                            | 35                                             | 14 | 2  | 39                        | 11 | 8  | 43              | 7  | 6  | 50              | 16 | 8  | 47                            |
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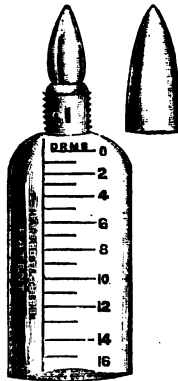
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and as The Distillers Coy. Ltd., purchased over 400,000  
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on their own premises. The machinery employed is of the  
most perfect description and every lot made is carefully  
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The "D.C.L." MALT EXTRACT can be obtained  
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samples sent free on application, and are respectfully  
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There are several older makes of Malt Extract now before the public which are valueless in  
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Ladies suffering from nervous  
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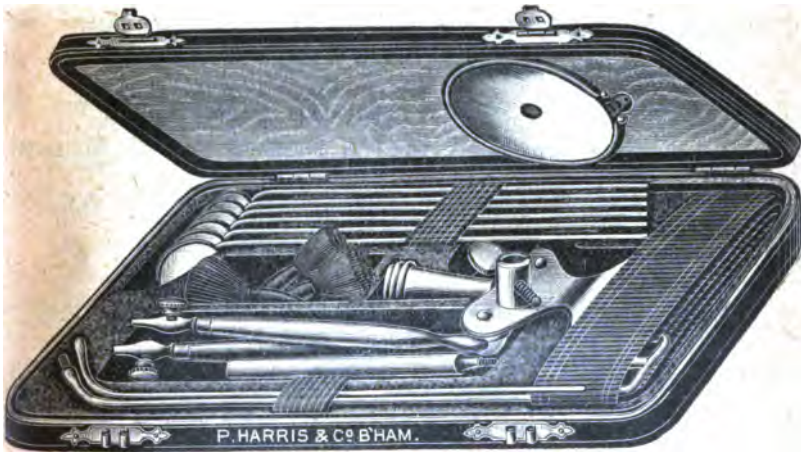
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For all Gouty Affections.

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CONTAINS THE ESSENTIAL ELEMENTS of the

Animal Organisation—Potash and Lime ;

THE OXIDISING AGENTS—Iron and Manganese ;

THE TONICS—Quinine and Strychnine ;

AND THE VITALISING CONSTITUENT—Phosphorus: the whole combined in the form of a Syrup, with a SLIGHTLY ALKALINE REACTION.

IT DIFFERS IN EFFECT FROM ALL ANALOGUS PREPARATIONS ; and it possesses the important properties of being pleasant to the taste, easily borne by the stomach, and harmless under prolonged use.

IT HAS GAINED A WIDE REPUTATION, particularly in the treatment of Pulmonary Tuberculosis, Chronic Bronchitis, and other affections of the respiratory organs. It has also been employed with much success in various nervous and debilitating diseases.

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ITS ACTION IS PROMPT ; it stimulates the appetite and the digestion ; it promotes assimilation and it enters directly into the circulation with the food products.

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Infancy, Cholera Infantum,  
Marasmus, &c., in Chronic  
Dyspepsia, and Morning Sickness

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has proved itself an efficient agent.

Dose: 10—15 grs.

### FORMULA :

|                          |     |     |            |
|--------------------------|-----|-----|------------|
| Sugar of Milk            | ... | ... | 40 ounces. |
| Pepsin (Pure)            | ... | ... | 8 "        |
| Pancreatine (Pure)       | ... | ... | 6 "        |
| Veg. Ptyalin or Diastase | ... | ... | 4 drachms. |
| Lactic Acid              | ... | ... | 5 fl. "    |
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Lactopeptine contains all of the principal agents employed by nature in the digestion of food, the physiological acids, hydrochloric and lactic, the starch-converting ptyalin, the proteid digestant pepsin, and the starch-converting fat-saponifying pancreatine. Lactopeptine, therefore, aids in the digestion of all kinds of food, and is consequently a rational remedy in all gastro-intestinal disorders requiring a potent digestive agent.

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